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Construction Methods AND EQUIPMENT

A M C G R A W - H I L L P U B L I C A T I O N

JUNE, 1957



In Arizona, big portable duplex crushing plant pours out aggregates for highway job . . . page 2

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**"Yellow Strand
Wire Rope is
our choice...
has been for
10 years..."**

says Mariani Construction Co., Inc.
New Haven, Conn.

Yellow Strand



... always on hand



No matter where your job is located, there's a Yellow Strand distributor nearby. He has "stocks on hand." In addition, B & B warehouses are located conveniently throughout the country.

Here's one of Mariani Const. Co.'s cranes setting stone on bridge construction. It's on a section of the Connecticut Turnpike in New Haven. All of Mariani's shovels and cranes are equipped with Yellow Strand Wire Rope. Alfred Comera, supt. of equipment, says, "We've used Yellow Strand for 10 years. It has proven itself satisfactory throughout the years."

Yellow Strand Flattened Strand and "Power-steel" Wire Ropes are "standard choice" of many contractors. They're available in a wide range of sizes. They're tough, strong and wear resistant. They have an in-built quality from more than 80 years of manufacturing wire ropes exclusively. Why not check with your B & B distributor — he can assist you and save you wire rope money.

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B.F. Goodrich



All-Nylon B.F. Goodrich tires give over 4 years' service to highway excavator

GASPARINI EXCAVATING CO., INC., of Peckville, Pennsylvania, does highway and heavy construction work. Here the company's equipment is at work on the Pennsylvania Turnpike, hauling giant loads over rock-strewn roads. For this rugged work, the company uses B.F. Goodrich FLEX-RITE nylon tires, reports many give over 4 years' service, including 2 retreads.

"B.F. Goodrich all-nylon tires have minimized breakdowns, impact breaks and other cost and time-consuming delays," writes President Gene Gasparini. "They help us give maximum contract performance in the shortest contract period."

B.F. Goodrich tires are built with FLEX-RITE nylon cords. FLEX-RITE nylon cords withstand double the im-

pact of other cord materials, resist heat blowouts and flex breaks. Result: more retreadable B.F. Goodrich tires!

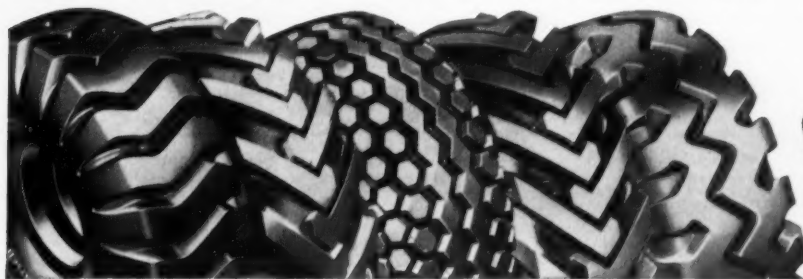
Your B.F. Goodrich dealer has a complete line of tires for every off-the-road job, including the new Rock Service Tubeless or tube-type (far left) for mining, quarrying and dirt-moving jobs. And he offers expert, on-the-job tire service. See him today or write B.F. Goodrich Tire Co., A Division of The B.F. Goodrich Co., Akron 18, Ohio.

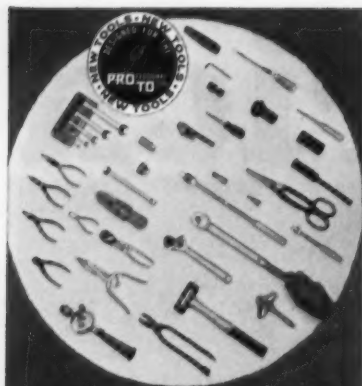
There's a B.F. Goodrich tire for every construction job

Specify B.F. Goodrich tires when ordering new equipment



Your B. F. Goodrich dealer is listed under Tires in the Yellow Pages of your phone book





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**Forging Ahead Through Leadership
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Construction Methods

AND
EQUIPMENT

JUNE, 1957

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**Construction
Methods**



On the Cover

From a dry, dusty pit where 60% of the material is dirt and fines, Arrow Construction Co.'s Pioneer 44V gravel plant produces road material. The Yuma, Ariz., firm's big unit handles up to 435 tph of raw material to turn out aggregates (including those in the ¾ to 1½-in. range) and chips. In the setup pictured, chips are weighed in a portable scale beneath the hopper before the conveyor loads them into the truck. Note that conveyor has both gasoline and electric drive.

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June, 1957

Pay Dirt in This Issue

Big Fleets Push Virginia Pike 92

There's not a shovel on the job. Fleet of scrapers and a loader move dirt for Richmond-Petersburg Turnpike.

What Caused This Failure? 98

Motor-driven camera dramatically records collapse of bridge spanning the Rhine River at Dusseldorf, Germany.

Long Caissons Support Wharf 100

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Piggy-back form travelers, a canal paving machine, and bootstrap jacking help do the job at a New York airport.

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Faced with servicing jobs over large areas, contractors use a variety of small planes to carry mail, men, parts.

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NEXT MONTH

The July issue will be CM&E's annual Guide to Equipment Maintenance. It will contain information every contractor needs to keep his equipment productive for long periods of time at the lowest cost. In addition, it will include a listing of manufacturers' service manuals.

THE WORKHORSE of the 3/4 yd. FIELD!

Here's a machine you can put into 3/4 yd. work and know you are going to get full 3/4 yd. output from it. The Northwest Model 25 is built for the workhorse jobs. Machinery Bases are rugged, heat treated alloy steel castings. Machinery side frames are cast integral with the rotating base casting. Realize what this means. It assures a lifetime permanence of shaft alignment. It eliminates weaving that is the direct cause of wear. *There is nothing else like it!*

You can go through the whole machine — Booms! — Sturdier for workhorse digging and lifting. Uniform Pressure Swing Clutches! — cooler running, trouble-free. The Helical Gear Drive! — running in oil, mounted on anti-friction bearings free from the adjustments and stretching that come with chain drives. The "Feather-Touch" Clutch Control! — with the feel of the load free from the complications of delicate mechanisms, valves, pumps and tubing. The Cushion Clutch, a wide range of Boom Hoist Equipment to choose from, Easy Convertibility — These and many more advantages give you a piece of equipment with ability that you can't find anywhere else for handling the workhorse jobs and making money.

This is the 3/4 yd. machine you should investigate. A Northwest Man will fill in the details.

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EVER BUILT INTO
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DRAGLINE OR
PULLSHOVEL

"Texaco Marfak stays

reports The Arundel Corporation & L. E. Dixon Company

You can see why the Tulloch Dam is a tough job — and mid-summer heat makes it even tougher on bearing grease. "It's the stay-put quality of *Texaco Marfak* that's most valuable to us on this job. Even under heavy shock loads, *Texaco Marfak* stays in chassis bearings. It seals out dust and dirt—and prevents rust. It has meant longer life for our parts,

lower maintenance cost, and, above all, our equipment stays on the job."

Mud and dirt are kept out of wheel bearings too by *Texaco Marfak Heavy Duty 2*. This assures safer braking and extra miles between lube jobs. No seasonal change is ever needed with *Texaco Marfak Heavy Duty 2*.

The builders also comment on the cleanli-



TEXACO

in the bearings longer”

ness of their diesel engines which use *Texaco Ursa Oil Heavy Duty*. Like all *Texaco Ursa Oils* it makes diesels and heavy duty gasoline engines deliver more power with less fuel over longer periods between overhauls.

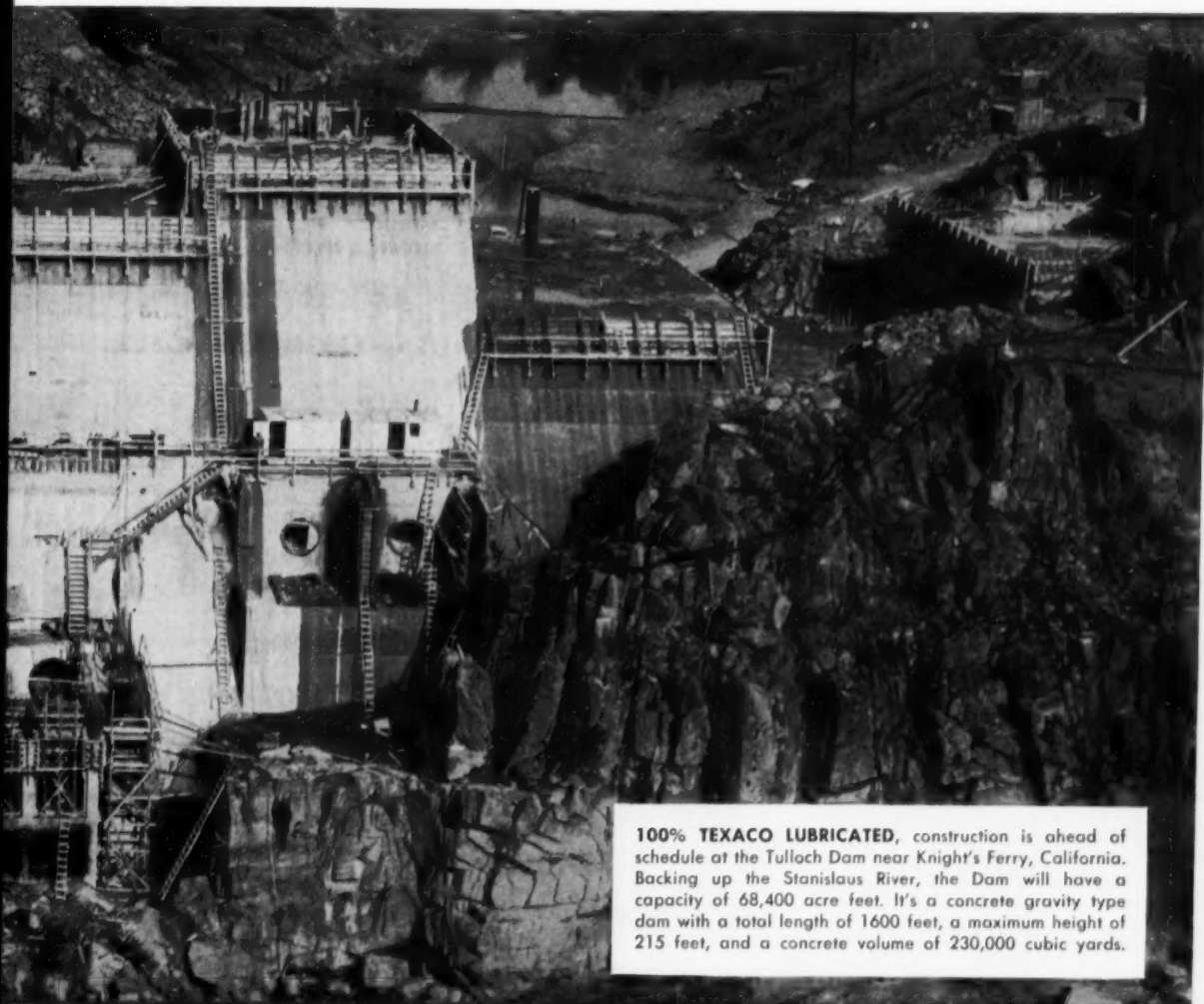
Your crawler mechanisms will work smoother when fully protected like those on the Tulloch Dam job with *Texaco Track Roll Lubricant*. And you'll be sure your drills—running or idle—are protected against rust

with *Texaco Rock Drill Lubricant EP*.

ASK A TEXACO LUBRICANT ENGINEER to set up a Texaco Simplified Lubrication Plan for your project. All you have to do is call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

☆☆☆

The Texas Company, 135 East 42nd Street,
New York 17, N. Y.



100% TEXACO LUBRICATED, construction is ahead of schedule at the Tulloch Dam near Knight's Ferry, California. Backing up the Stanislaus River, the Dam will have a capacity of 68,400 acre feet. It's a concrete gravity type dam with a total length of 1600 feet, a maximum height of 215 feet, and a concrete volume of 230,000 cubic yards.

Lubricants and Fuels

FOR ALL CONTRACTORS' EQUIPMENT

THERE'S A "Euc" SCRAPER MATCHED T

3

TYPES

Euclid offers you the most complete line of self-powered scrapers in the industry—and they're all job-proved to give you more work-ability and low cost yardage. No matter what your job may be—from small clean-up or grading work to big yardage projects—there's a size and type that meets your requirements.

SIX-WHEEL SCRAPERS

These models provide maximum stability for long, high speed hauls. They have capacities of 12, 18 and 24 yds. struck . . . are powered by engines of 200 to 335 h.p. and haul heaped loads of 16, 25 and 32 yds. at speeds up to 30 mph.

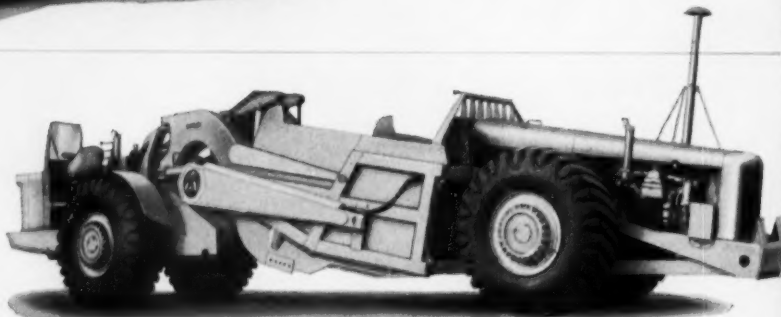


OVER-HUNG ENGINE MODELS

Payload capacities of these "Eucs" are 7, 12 and 18 yds. struck . . . 9, 16 and 25 yds. heaped. Over-hung engine design of tractors provides excellent maneuverability and ease of handling in difficult work . . . engines are 143, 300 and 335 h.p.

TWIN-POWER SCRAPER

With a total of 518 h.p., this Euclid has a struck capacity of 24 yds. . . 32 yds. heaped. Two engines, each having a separate Torqmatic Drive, enable this "Euc" to work independent of other equipment and move more yards at lowest cost on any scraper job.



▶ Your Euclid dealer can supply performance and cost data on the Euclid Scrapers best suited to your operations. Have him show you why Euclids are your best investment.

EUCLID DIVISION, GENERAL MOTORS CORPORATION, Cleveland 17, Ohio



Euclid Equipment

FOR MOVING EARTH, ROCK, COAL AND ORE



TO ANY SIZE OR KIND OF JOB

7

MODELS
job proved
and available now!



S-7 Model S-7 is equipped with 143 h.p. engine... 18.00 x 25 tires... 4-speed Torqmatic Drive... full hydraulic 90° steering. Capacity is 7 cu. yds. struck and 9 yds. heaped at 1:1 slope. Optional tires are 21.00 x 25.



S-18 This Model S-18 has a 300 h.p. engine with 4-speed Torqmatic Drive. Struck capacity is 18 cu. yds. ... 25 yds. at 1:1 heap. Tires are 27.00 x 33 with 33.50 x 33 optional... full hydraulic 90° steering.



SS-18 The Model SS-18 has a 300 h.p. engine and 3-speed Torqmatic Drive. Capacity is 18 cu. yds. struck and 25 yds. heaped. Front tires are 14.00 x 25... 24.00 x 25 tires on drive and scraper wheels with 29.5 x 25 optional... hydraulic booster steering.



TS-24 The Model TS-24 has a 300 h.p. engine for the tractor and a 218 h.p. engine for the scraper... each with a separate Torqmatic Drive. Heaped capacity at 1:1 is 32 cu. yds. ... 24 yds. struck. Full 90° hydraulic steering... 27.00 x 33 tires with 33.50 x 33 optional.



S-12 Powered by a 218 h.p. engine, the Euclid S-12 Scraper has a 5-speed transmission... 24.00 x 25 tires... full hydraulic 90° steering. Struck capacity is 12 cu. yds. ... at 1:1 heap, 16 yds.



FDT This 4-wheel tractor model has a struck capacity of 12 cu. yds. ... 16 yds. heaped... and is available with 200 or 218 h.p. engine and 5-speed transmission. Tire sizes are 12.00x25 front and 21.00x25 on drive and scraper wheels with 24.00x25 optional.

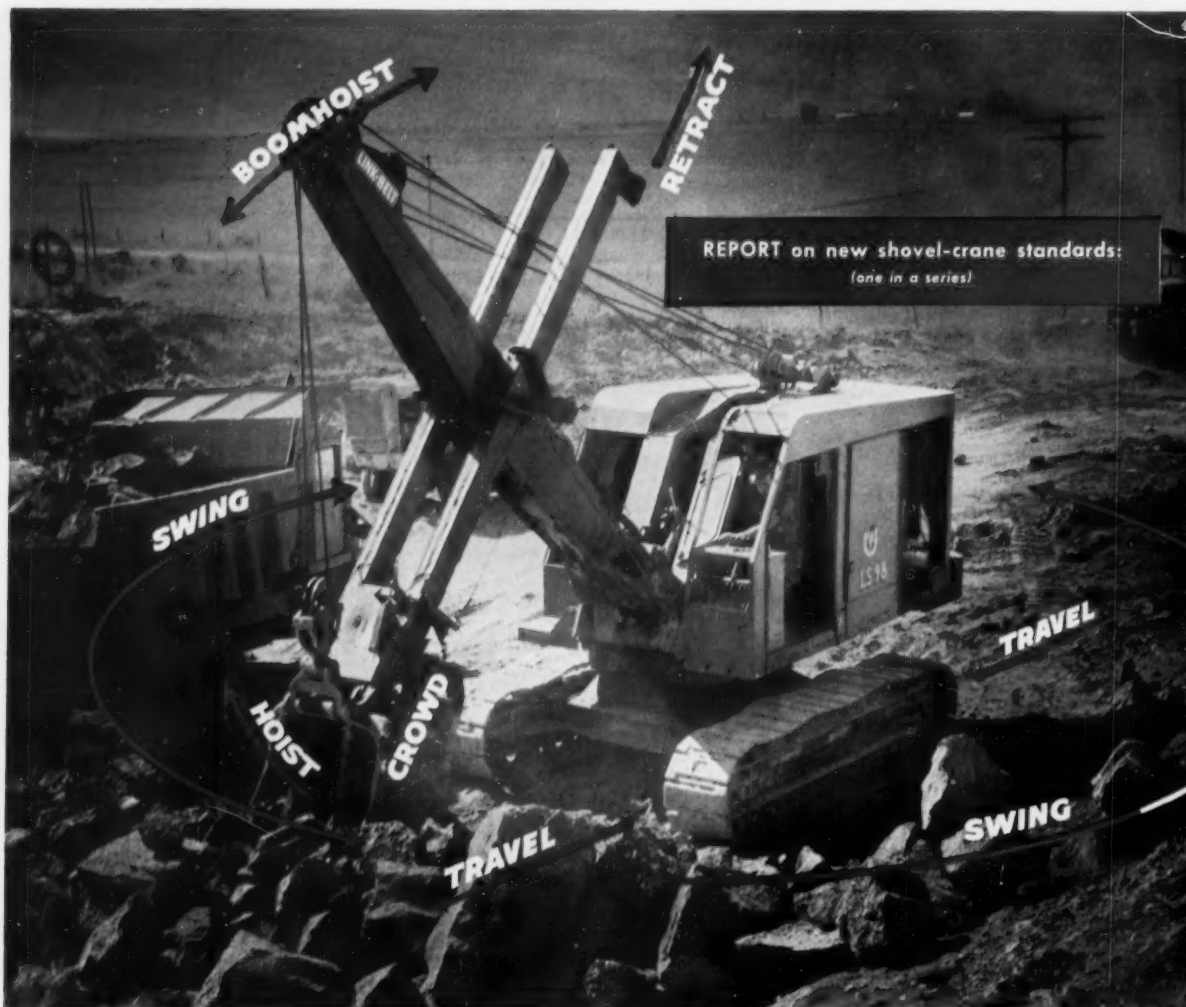


SS-24 A 300 or 335 h.p. engine with Allison 4-speed transmission and converter lock-up powers the Model SS-24. Struck capacity is 24 cu. yds. ... 32 yds. heaped. Front tires are 14.00 x 25... drive and scraper tires are 27.00 x 33 with 33.50 x 33 optional for maximum traction and flotation.



"Euc" Scrapers have hydraulic lever action, 4 section adjustable and reversible cutting edges, unequalled accessibility and other cost-cutting advantages. Check the complete Euclid line before you decide on any scraper equipment.

Producing 9 hours'



ALL OPERATIONS ARE COMPLETELY INDEPENDENT —

In addition to eliminating shifting time, *Independent-Travel* allows the operator to swing and hoist the load while traveling. Whether to save time or to jockey the boom around obstacles, the operator can swing the boom while his machine is travelling in either direction. This optional feature can be used with any front-end attachment.

MORE USABLE HORSEPOWER — Size for size, Link-Belt Speeder shovel-cranes utilize more of the engines' available horsepower. This bonus pays off in added power at the bucket teeth, greater line pull plus extra power to swing, hoist and travel. Although it gets more usable power and line pull out of the same engines used in other shovel-cranes, a Link-Belt Speeder remains well within the engine manufacturers' recommended operating speeds.



output in 8 hours...

Independent-Swing-and-Travel is available on 11 Link-Belt Speeder models. Eliminates shifting . . . saves 20-30 seconds each machine move

Users of Link-Belt Speeder shovels, hoes, draglines and cranes are setting new high production standards by equipping their machines with *Independent-Swing-and-Travel*. This optional feature eliminates time losses ordinarily occurring when operators shift from swing to travel and from travel to swing. With *Independent-Travel*, shifting is eliminated and the machine can travel and swing simultaneously.

Speed, maneuverability, safety

Owners of machines equipped with *Independent Travel* report that the feature gives them higher percentage of work time spent in actual productive effort. What's more, they say it greatly decreases operator fatigue, keeps end-of-the-shift output at previously impossible high levels. In addition, because all operations are independent of each other (as shown in illustration at left) the machine maneuvers more readily in tight quarters and is able to move away from bank cave-ins in split seconds.

80 extra yards a day

Here's a conservative comparison of what happens when a Link-Belt Speeder 1-yard hoe with *Independent-Travel* is matched against an equal-sized ordinary hoe:

Digging to a depth of 6 feet, with each machine averaging a move every 7 feet, the Link-Belt Speeder with *Independent-Travel* eliminates shifting, producing an extra 80 to 90 yards, digging an added 120 lineal feet of trench per 8-hour shift because it has converted shifting time into work time!

Figured at 35 cents a yard, it earns an increased return of about \$30 per shift or more than \$600 extra each 20-day working month.

Cuts maintenance bills

The design of *Independent-Travel* calls for separate power trains, separate clutches, shafts, gears and bearings for swing and travel. As opposed to ordinary machines — which have but one power train to perform both functions and therefore have these components in almost constant use — the Link-Belt Speeder with *Independent-Travel* separates the functions . . . divides total wear over two power trains. Life of shafts, clutches, gears and bearings is practically doubled.

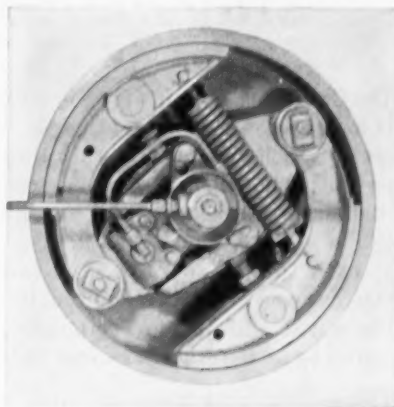
This is but one of many reasons why Link-Belt Speeder machines are completely revising existing standards of high-speed, high-profit shovel-crane operations. Contact your Link-Belt Speeder distributor or write: Link-Belt Speeder Corporation, Cedar Rapids, Iowa.

14,325



SIMULTANEOUS SWING AND TRAVEL

Independent-Travel eliminates shifting from swing to travel, from travel to swing and provides completely independent control. And fingertip-operated Speed-o-Matic — the only true power hydraulic system — makes every shovel-crane movement fast, easy, positive. With a flick of the wrist the operator puts his machine through its paces. There is little, if any, end-of-the-shift letdown.



LESS MAINTENANCE — Self-compensating hydraulic piston automatically adjusts the clutches . . . eliminates operator's daily clutch adjustments for heat expansion and normal lining wear. With Speed-o-Matic, hydraulic pressure does the job.

It's time to compare . . . with

LINK-BELT SPEEDER

Builders of a complete line of shovel-cranes . . . with exclusive Speed-o-Matic power hydraulic controls

Another Goodyear First:

V-Belts *with the* **Green Seal**



stay matched from factory to drive

The Green Seal signifies true dimensional stability. It means that now when you reach for a matched set of V-belts, you can be sure they're matched — no matter how long they've lain on the shelf. And that means longer life and a minimum of down time.

It used to be that only steel-cable V-belts by Goodyear were length stabilized. But now, through the miracle of Triple-Tempering, they've been joined by all the other Goodyear Industrial V-belts.

Triple-Tempering is the exclusive process wherein synthetic cord is carefully brought to the peak of strength and stability by controlled tempering with Tension, Temperature and Time. And this gives you not only *length* stability in storage, but greater

shock- and stretch-resistance on the drive.

In addition to 3-T load-carrying members, the Green Seal also brings you "balanced construction." This means each component of the belt is specifically designed to its job to give you cleaner, smoother, longer running which adds up to maximum, trouble-free horsepower hours at minimum cost.

The next time you need V-belts, be sure they're wearing the Green Seal—the mark of a V-belt made with the technical know-how of the world's largest rubber company. They're readily available at your Goodyear Distributor. Or write for details to Goodyear, Industrial Products Division, Lincoln 2, Nebraska, or Akron 16, Ohio.

DIMENSIONALLY STABLE V-BELTS by

GOODYEAR

THE GREATEST NAME IN RUBBER

Green Seal—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

Construction News From Washington

**Washington, D.C.
June, 1957**

Concrete vs Asphalt

The old concrete-vs-asphalt contest is on again. Up for review is the Air Force decision of a year and a half ago to install only rigid pavement at jet aircraft facilities. Now jet requirements will be looked into again.

Appeals from asphalt producers and paving contractors prompted the new inquiry. At the same time, the Air Force is going ahead with plans to test the relative economies of various rigid pavement designs. Experimental sections will be built this summer in Ohio to test performance under 300,000-lb loads at 300-psi tire pressure.

The Air Force also will soon ask bids for contracts to construct test runways in Mississippi to help determine the relative costs of prestressed and reinforced slab.

Military Construction Cuts

Military construction plans call for \$1.5 billion of new spending authority for facilities, including so-called satellite air strips, missile bases, and Navy air stations. Some 75% of this appropriation request is for the U.S. The balance is for projects overseas.

Originally, the Pentagon wanted \$2.1 billion for its program next year. This was whittled down to \$1.7 billion and later reduced further by the White House to the \$1.5 billion request that went to Congress.

But actual money available for construction spending—money voted in past years as well as this—will maintain the spending rate in fiscal 1958 at \$2 billion.

Outlook for Civil Works

Spending on federal civil works projects next year—the “pork barrel” items such as rivers and harbors projects—won’t be noticeably reduced by the economy wave.

Spending for the year beginning July 1 will be about \$880 million for all water resources construction. That is more than \$100 million above the year just ending. This figure was the estimate Pres. Eisenhower gave Congress in January, and it still holds. There may be a small cut in appropriations for next year, but it won’t have any noticeable effect on actual spending.

continued on next page

Construction Politics

Democrats are going to try to make tight money their big campaign issue for next year's Congressional elections and—if it works out—for the Presidential race in 1960.

They're convinced that votes can be made by talking up the impact of short credit and high interest rates on borrowers who want homes, schools, commercial building, public works, and the like. The Democratic party bigwigs who met in Washington a recent weekend charged "big business and the banks" with making high profits from the favorable climate in Washington while other segments of business suffer.

Just about every issue still will be around next year, the Democrats feel. They'll be talking about giveaways at Hell's Canyon and in the atomic power program, benefits to business from fast amortization of plant and equipment, and failure of lease-purchase for government buildings.

Lease-Purchase Will Be Revived

Lease-purchase is going to be given another try. General Services Administration officials have been studying money-market prospects during the three months since they called a temporary halt to bid advertising. When they stopped, they had managed to get under construction only one building out of a total valued at nearly \$700 million approved by Congress.

By the end of this year, they hope to advertise 39 buildings with a total cost of about \$71 million. GSA is changing its methods of operation; it will sound out investors before advertising for construction bids. No bids will be asked unless GSA officials are satisfied that the financing of the project is fairly certain. They feel that long-term, 4% money will be available.

Beck and Construction

Squeezing Beck out of the AFL-CIO has one important meaning for the construction industry: Beck's departure lessens the danger that a big labor split will produce a rash of jurisdictional fights between the Teamsters and the rest of the labor movement; local Building Trades officials and local Teamster officials will have no new reason for a falling out. Had Beck kept his power, the top-level split might have gone down through the ranks.

Another angle: the jurisdictional fight between craft and industrial unions has simmered down because of AFL-CIO concentration on Beck and racketeering. This diminishes chances of a blow-up in the running efforts of Building Trades and industrial union leaders to draw up a peace plan dividing construction jobs in factories. The longer the issue is up for debate, the better the chances of finding a solution.



Bonds fast

A trained bond specialist will be at your side in no time if you call your Travelers agent.

He's a down-to-earth expert who knows your construction bond problems. He's an authority on local requirements—knows just what you need and what you don't need.

And he's backed by The Travelers—a firm with a nationwide reputation for getting bonds to responsible contractors FAST.

The Travelers complete service for contractors also includes:

Workmen's Compensation and Public Liability insurance with effective safety engineering to reduce accidents.

Contractor's Equipment Floaters and Builders' Risk insurance serviced by a nationwide claim organization that can give you prompt attention anywhere.



YOU WILL BE WELL SERVED BY

THE TRAVELERS

INSURANCE COMPANIES, HARTFORD 15, CONNECTICUT

*All forms of business and personal insurance including
Life • Accident • Group • Fire • Marine • Automobile • Casualty • Bonds*



New A-Line models range from 1/2-ton Pickups through 33,000 lbs. GVW Six-Wheelers.

NEW ACTION-STYLING! MORE USABLE POWER!

Here is the crowning achievement of fifty years of quality truck production—the great new Golden Anniversary INTERNATIONAL Trucks!

They're *Action-Styled* with fresh, clean functional lines that set a new style pace.

They're powered by new engines that put out more *usable* horsepower—including the most powerful "six"

available in its field! They have exclusive new cab mountings for quieter, more level ride. New brakes, new steering, new frames—and many other new features.

The result is a new line of trucks that—more than ever before—are built to cost *least* to own!

See and drive these newest INTERNATIONALS today! International Harvester Company, Chicago.

Trucks Unlimited... Powered for Modern Traffic... Plus Modern Comfort

Handsome "Golden Jubilee" Pickup with the *longest* all-steel body in its class. Only Panel with third door. New 8-passenger Travelall® models. New cab-forward models with ideal 89-inch BC dimension. Tractors to 48,000 lbs. GCW. Wide range of all-wheel-drive trucks.

Redesigned engines produce *increased* power without strain from new combustion chamber and valve position . . . more usable power that's "bred for the job" . . . at low rpm to keep operating and maintenance costs low. New quick-starting 12-volt ignition.

Biggest windshield—1,181 sq. in.—and *widest* cab in their class! New "Silent-Vent" door wings. New, wider front and rear springs. Exclusive level-riding 5-point cab mounting. Bigger brakes with more lining area, larger cylinders and boosters for quicker, easier stops.

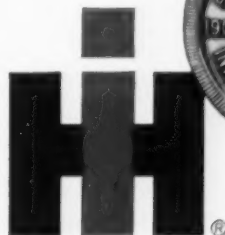


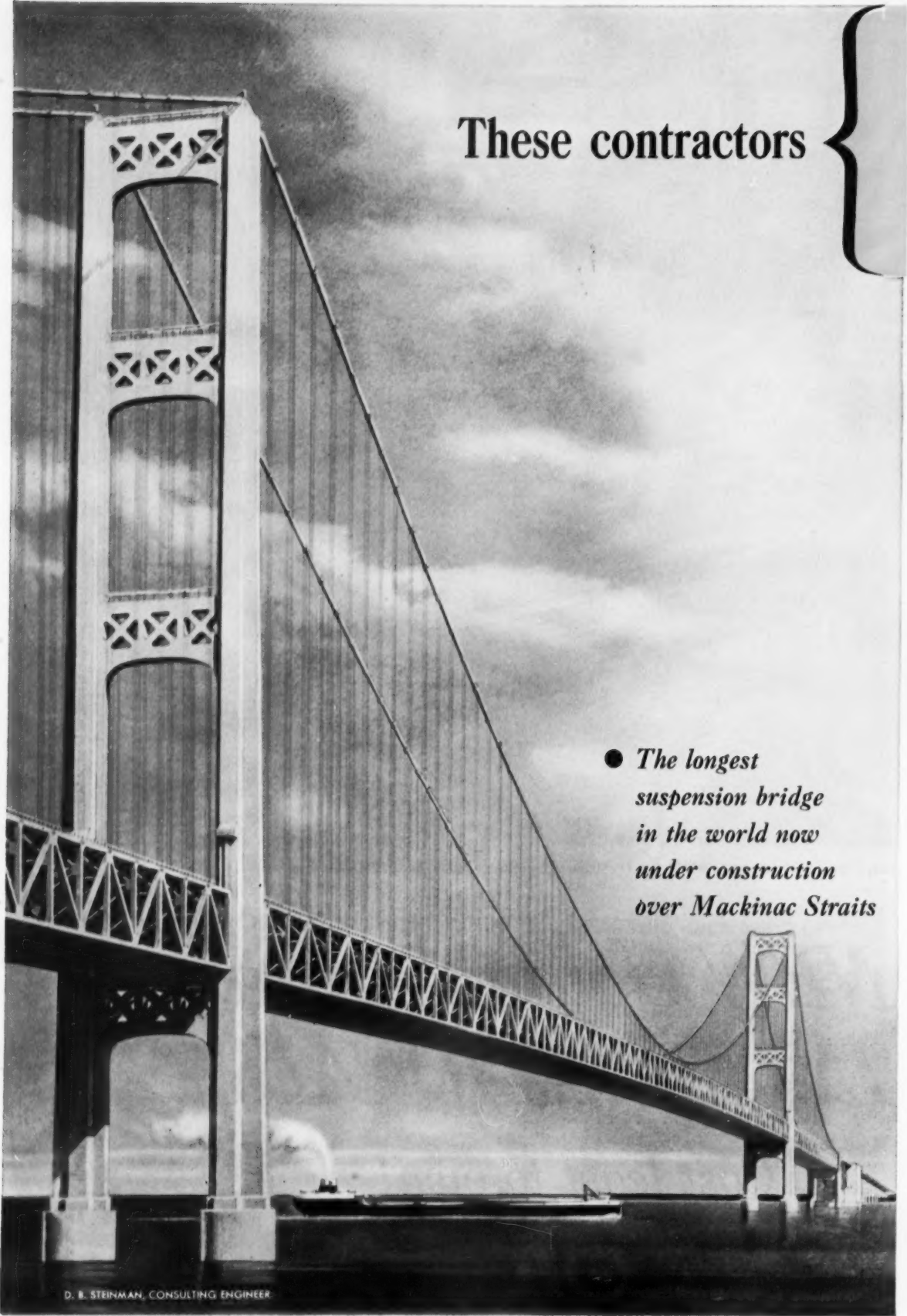
Other INTERNATIONALS, to 96,000 lbs. GVW, round out the world's most complete line.

NEW Golden Anniversary INTERNATIONALS

Cost least to own!

Motor Trucks • Crawler Tractors • Construction Equipment
McCormick® Farm Equipment and Farmall® Tractors





These contractors

- *The longest suspension bridge in the world now under construction over Mackinac Straits*

D. B. STEINMAN, CONSULTING ENGINEER

Merritt-Chapman & Scott Corporation and American Bridge Division of U. S. Steel Corporation

use Shell Lubricants in the construction equipment on Mackinac Bridge project

Today's engineering knowledge and modern construction equipment are making the mighty Mackinac Bridge a reality. This equipment requires oils and greases which will remain stable and give adequate lubrication at extreme temperature ranges. To keep their heavy-duty machines operating at maximum efficiency with a minimum of down time, both companies, Merritt-Chapman & Scott Corporation and American Bridge, chose Shell Lubricants and Fuels.

The Mackinac Bridge project is just one of the many construction operations where equipment was lubricated and protected by Shell products. Wherever *heavy-duty* equipment operates, Shell Lubricants and Fuels are being used to keep machinery in top operating condition and hold maintenance costs down. Perhaps it will pay you to investigate the savings that can be realized through the use of Shell Industrial Lubricants and Fuels.

SHELL OIL COMPANY SUPPLIES:

Gasoline	Solvents
Fuel Oil	Motor Oils
Diesel Fuel	Anti-Freeze
Kerosene	Greases
Industrial Lubricants	Outboard Motor Oil
and many other fuels and lubricants	



American Bridge Division of U. S. Steel Corporation has strung a total of 12,500 tons of cable as part of the 66,500-ton superstructure.

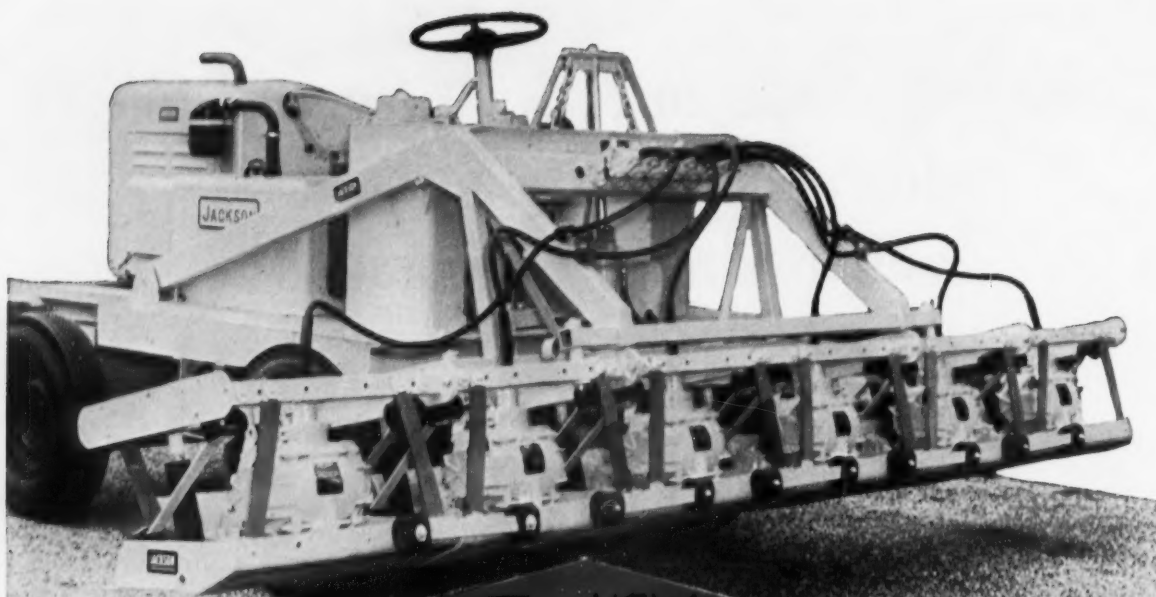


One of the 34 piers of the bridge substructure built by Merritt-Chapman & Scott Corporation.

SHELL OIL COMPANY

50 West 50th Street, New York 20, N. Y. • 100 Bush Street, San Francisco 6, Calif.





The NEW JACKSON VIBRATORY COMPACTOR

**HAS MUCH MORE POWER and
SPEED . . . UNMATCHED ADAPT-
ABILITY TO JOBS OF ALL TYPES!**

Here's the machine that will give you maximum density of all materials normally used in macadam base courses and sub-bases with the greatest economy and convenience.

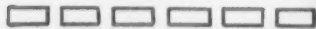
It's a vastly improved version of the Jackson Multiple Compactor which was used with great success on virtually all the nation's important paving projects. It is much more powerful and faster, providing time-saving, full course, single pass compaction. And unmatched as it is for quick and easy adaptability to jobs of all types, it will handle each of them with greatest convenience and least lost motion. Moreover, with this machine you can get into places others can't reach. By all means see your nearby Jackson Distributor (name on request) about this machine or write to us for the complete facts before buying any compactor.

**ANY ARRANGEMENT DESIRED OF VIBRA-
TORY UNITS IN THE WORKHEAD TO FIT
THE JOB MOST ADVANTAGEOUSLY
IS QUICKLY AND EASILY ACHIEVED**

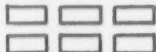
JACKSON VIBRATORS, INC.
LUDINGTON, MICHIGAN



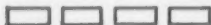
6 UNITS ABREAST FOR MAXIMUM
COVERAGE



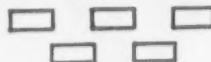
6 UNITS IN TANDEM FOR MAXIMUM ONE
PASS CONSOLIDATION



4 UNITS (or it might be 5) TO EXACTLY
FIT JOB WIDTH REQUIREMENTS



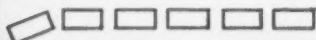
5 UNITS IN TANDEM AND STAGGERED.
VARIABLE FOR A WIDE RANGE OF WIDTHS.



4 UNITS TOWED AT SIDE OF
TRACTOR. IDEAL FOR ONE
PASS WIDENING OPERATIONS.

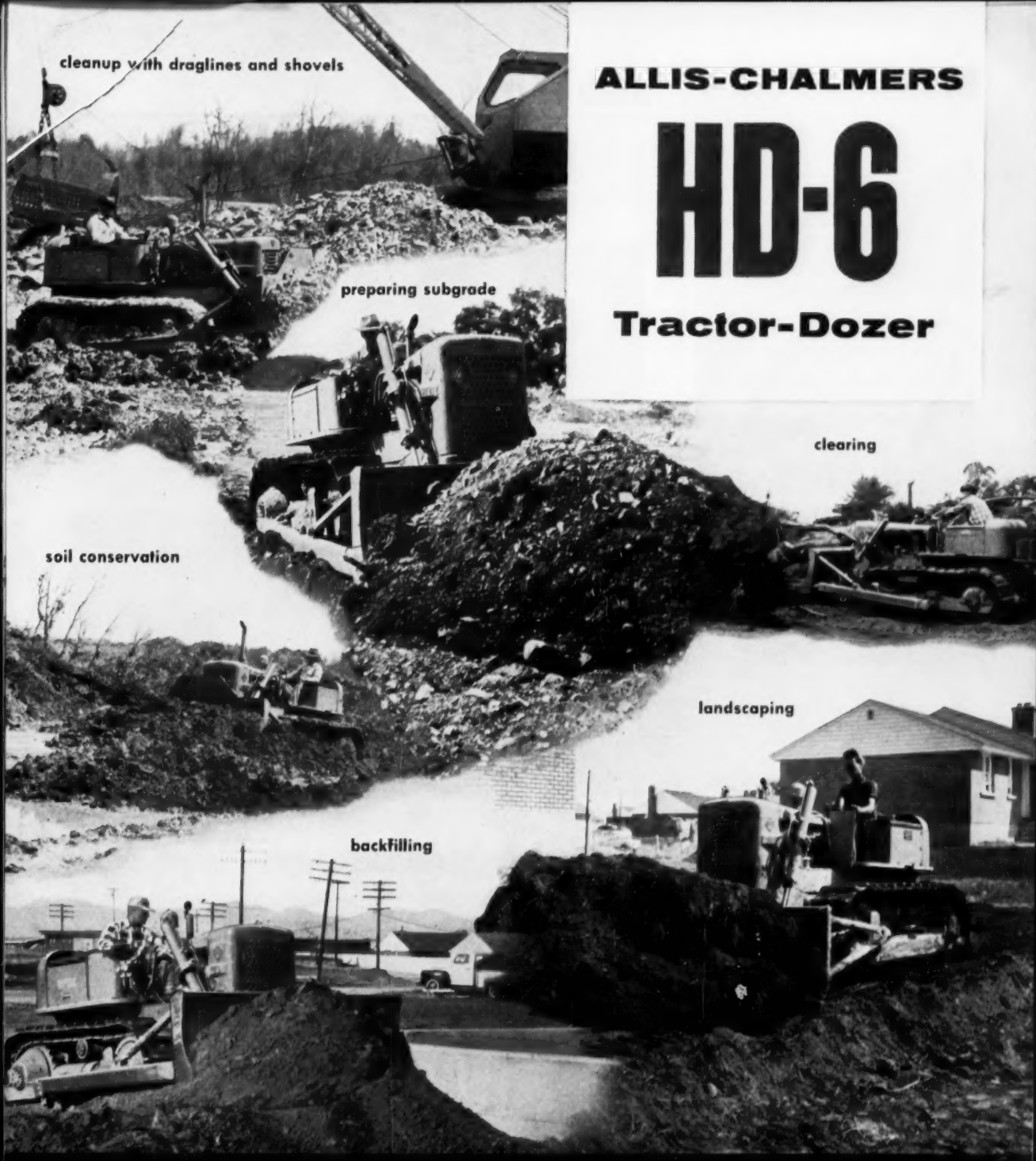


SHOULDER COMPACTION IS AUTOMATIC.
End unit automatically assumes this position — no adjustment required. Prevents raveling.



AND FOR SPOTS OTHERS CAN'T REACH.

Any of the compacting units in the Jackson Vibratory Compactor workhead can be fitted with operating handle and used exactly like the nationally renowned Jackson Manually Guided Compactors. Perfect for getting into odd spaces and close to walls, etc. — spots that can't be reached by other equipment. One man with a twin hookup of two of these units will compact up to 1,200 sq. yds. of granular soils in 6" layers per hour.



cleanup with draglines and shovels

ALLIS-CHALMERS

HD-6

Tractor-Dozer

preparing subgrade

clearing

soil conservation

landscaping

backfilling

**Handles all these construction jobs faster,
easier than anything near its size!**

You can see it... but there's only
one way to prove it—on **your** job!

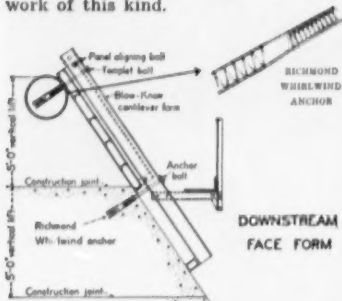
Massive Pours



Merritt-Chapman & Scott and The Savin Construction Corp., contractors, used 55,000 Richmond Whirlwind Anchors without slip or spill in this vast dam construction at American River, Folsom, California.

Economies with Richmond Whirlwind Anchor

In dam construction like the above, considerable speed and economy are to be gained by pouring successive monoliths in 5 ft. lifts into steel cantilevered forms. Success of this money-saving method depends, however, on one-point form anchorage that will positively withstand massive overhead pours and loads imposed from all directions. Richmond's *Whirlwind* anchor was designed especially to prevent slip for rugged work of this kind.

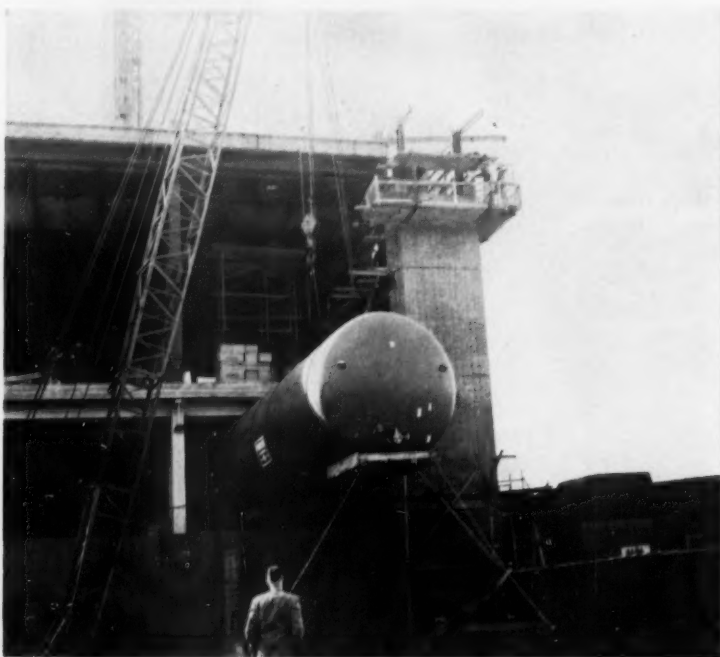


These Richmond anchors are mounted on the form before each monolith is started. Installation is easy. The *Whirlwind* is made with double coils, one coil takes the form bolt, the other supplies added anchorage to prevent slip in concrete during its low early strength period. There is no spalling. Richmond's development of these special anchors has been in large part responsible for the constantly increasing popularity of this fast, more economical, anchorage and pouring method.

For more information, or a copy of the Richmond Handbook of tying devices, anchorages and accessories for concrete construction, write: RICHMOND SCREW ANCHOR COMPANY, INC., 816 Liberty Ave., Brooklyn 8, N. Y. or 315 S. 4th St., St. Joseph, Mo.



Job Talk...



And the Beer Flows On...

Bertoldi-Kelter Co., New York contractor, found itself with a problem when it landed a contract to build an eight-story addition to F.&M. Schaefer Brewing Co.'s Brooklyn, N.Y. plant recently. Twenty-four glass-lined steel tanks had to be placed in the building. But steel shortages threatened to hold back delivery of the beer storage tanks too long for comfort. B-T couldn't wait; it had to deliver the brewers a

building within a designated time limit.

Jack Alexander, vice president of the company, decided to go ahead with the building, leaving a wall open through which tanks later could be placed.

When the tanks, measuring 46 ft in length, 12 ft in dia, and weighing 17 tons arrived, Alexander lifted each by crane to floor height and slipped the tank into place. When all tanks were set, the contractor later returned and bricked up the wall.



Forget Conduit Holes In Plywood Forms

Holes belong in doughnuts, not in plywood forms. That's the claim of the makers of a small, light, durable, and easily-handled conduit fitting called the "electrosert."

Used extensively throughout New England, the fixtures prove a fine substitute for the practice of boring holes in slab forms through which electrical conduit can pass. You just nail the fixture to the slab form, fit conduit into its opening, and pour concrete. After a pour, forms easily are stripped intact. Bak-Mak Corp of Milton, Mass. makes them.

continued on page 26

65 belt hp!

up to 15,500 lb drawbar pull!

forward speeds from 1.5 to 5.5 mph!

reverse to 4.1 mph!

ALLIS-CHALMERS

HD-6

Tractor-Dozer



**MORE POWER—BETTER DOZING SPEEDS—
BIG-DOZER DESIGN—NEW HANDLING EASE!**

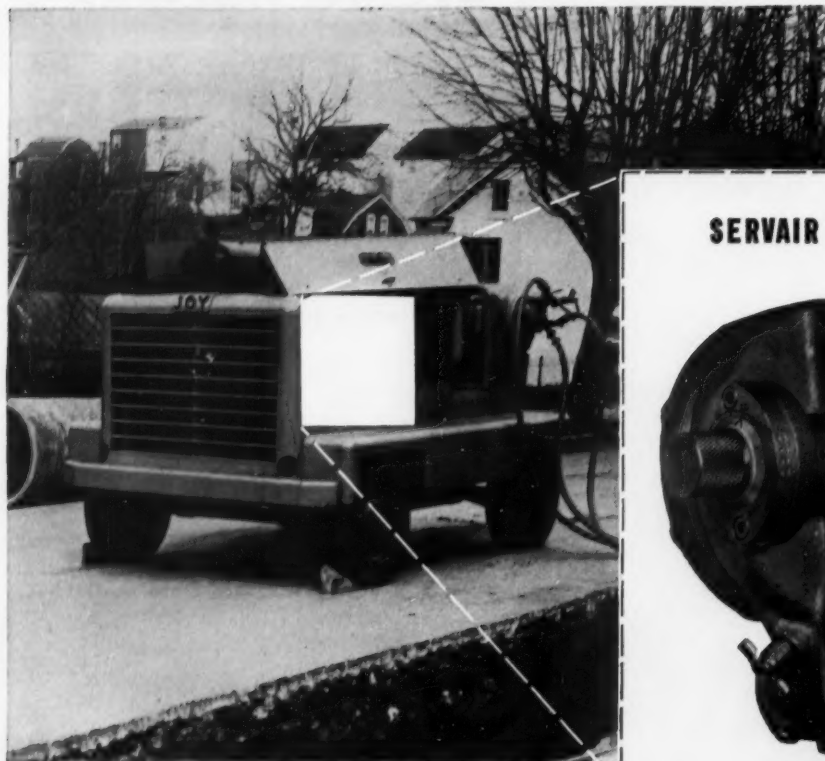


Only dozer of its size with these basic advantages . . . engine-mounted rams, long push beams, fewer linkage points (only 2 instead of 5 or 6). These big-dozer features all combine to provide more accurate, gouge-free dozing . . . longer equipment life.

Convenient rotary-valve blade control makes the HD-6 the easiest handling dozer of its size. With more than 5½ feet of track on the ground, it has outstanding flotation . . . yet turns easily in any terrain. The HD-6 also combines large, low-set front idlers with a blade snugged close to the radiator guard . . . to provide balance that means better dozing, more work done under any conditions!

You can see it . . . but
there's only one way to
prove it—on **your** job!





SERVAIR DEMAND CONTROL



ONLY JOY AIRVANE PORTABLE COMPRESSORS HAVE THIS NEW FOOL-PROOF LOAD CONTROL

The new Servair Demand Control takes the mystery out of pressure setting . . . makes it as simple as turning up the furnace thermostat at home. You just set the dial for the pressure you need and the Joy Airvane Rotary will deliver it.

The Servair is a true "demand" load control because it matches compressor output to demand . . . from 0% to 100% capacity. The control maintains steady air pressure regardless of the number and size of tools cutting in and out during operation, yet runs the engine only fast enough to meet the demand for air. This gives you top fuel economy and a minimum of wear and tear on the engine and compressor.

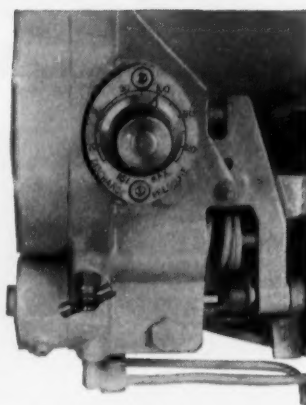
Joy Airvane Rotaries have many other features that make them trouble-free:

THERMAL BY-PASS—an exclusive oil circulating system that provides immediate lubrication and temperature control under all weather conditions.

DIRECT DRIVE—efficient spline coupling eliminates clutch (and clutch maintenance).

READY ACCESSIBILITY—to controls and items normally requiring regular maintenance.

You should get the whole story on Joy Airvane Portables before you consider any new compressor. Write **Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.** In Canada: **Joy Manufacturing Company (Canada) Limited, Galt, Ontario.**



"JUST SET THE DIAL FOR THE PRESSURE YOU NEED"

JOY ... EQUIPMENT FOR CONSTRUCTION ... FOR ALL INDUSTRY

WRITE FOR
FREE BULLETIN
181-23



Portable Air
Compressors



Wagon
Drills



Rock
Bits



Hand-Held
Rock Drills

You can see it, but there's
only one way to prove
what the **HD-6** can do for you!



**Call your nearby
Allis-Chalmers construction machinery dealer
—he'll demonstrate one on your job NOW!**

... or send us this

**Allis-Chalmers
Construction Machinery Division**
Milwaukee 1, Wisconsin

Gentlemen:

Please have the Allis-Chalmers construction machinery dealer
serving my area arrange a demonstration of the HD-6 tractor-
dozer for me.

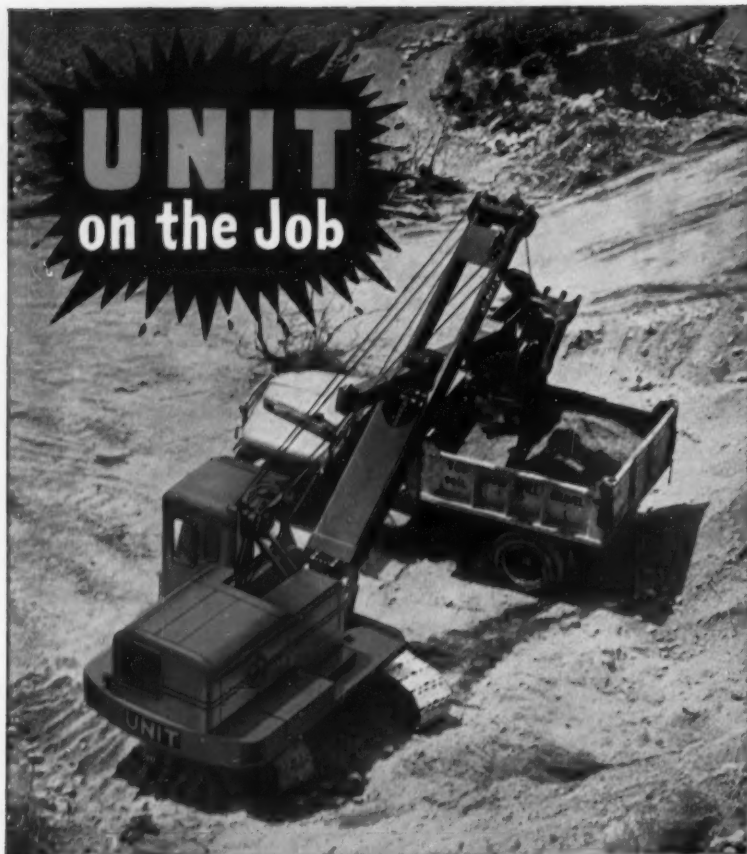
Name

Address

City State

Type of Work

UNIT on the Job



SWING SPEED makes PAY LOADS!

Here's a UNIT 1/2 Yard Shovel doing a PRODUCTION DIGGING JOB in a gravel pit. UNIT owners like the ease of operation and the FULL VISION CAB for complete visibility. They also like the sturdy construction and the many mechanical features, plus the ECONOMICAL PERFORMANCE and LOW UP-KEEP which all add up to EARNING POWER. Why not investigate what UNIT can do for you — on YOUR next excavating and material handling job?

SEE FOR YOURSELF: *Let us send you our novel TV Brochure. It illustrates the complete UNIT line.*

UNIT CRANE & SHOVEL CORPORATION
6305 WEST BURNHAM STREET • MILWAUKEE 14, WISCONSIN, U. S. A.



1/2 or 3/4 YARD EXCAVATORS...CRANES UP TO 20 TONS CAPACITY
CRAWLER OR MOBILE MODELS . . . GASOLINE OR DIESEL



All Models Convertible to ALL Attachments!

JOB TALK . . . continued



Sharpened Blade Shears Trees

Here's a quick way to clear a site. Mount a bulldozer blade in front of a king sized tractor; sharpen the bottom of the blade and use it to shear trees and brush level with the ground at a rate of 1 1/2 acres an hour. One contractor doing the job, cleared a total of 12,000 acres in less than 800 hr.



Welded Studs Anchor Bronze Curtain Walls

The news at New York's new Seagram's Building now nearing completion is the structure's all-bronze curtain wall design, one

Best HEAD in the BUSINESS!



- The Best Head in the Business—That's why 4 out of 5 buy Clipper.

Clipper SUPERMATIC is years ahead with the heavy duty cutting head powered by a specially designed 2 H.P. G.E. motor, and over 30 outstanding features found on no other masonry saw . . . it is engineering leadership by men who know the masonry cutting industry.

SUPERMATIC . . . the only masonry saw in the world with the cutting head you can raise or lower . . . safely . . . quickly . . . from 0" to 17"

without turning off the motor. No down time . . . more production time.

Whether cutting wall tile or cement block, the recessed Hi-Lo Control Wheel does everything! You're ready to cut at any height. No Adjustments to Make! No levers or knobs to pull, no slides, gears or unnecessary parts to wear out.

Call your Clipper Trained Factory Representative Collect and let us prove to you . . . on Free Trial . . . that we have the Best Head in the Business. Saws priced from \$335. And . . . for outstanding economy, use the World's Finest Blades . . . Clipper Premium Quality.

CLIPPER MANUFACTURING CO. • Phone Victor 2-3113 • 2800 Warwick • Kansas City 8, Mo.

OFFICES IN PRINCIPAL CITIES COAST TO COAST
 FACTORIES IN ENGLAND, FRANCE, GERMANY, ITALY

229X

3 TOUGH GIRDERS ACROSS HIS SKULL...

When an accidentally dropped, heavy wrench comes smashing down, the best odds of escaping injury are with the man in a Bullard "HARD BOILED" Hat or Cap. Across the most delicate portions of his head and skull, Bullard Engineers have rigged three tough girders. These three high ribs, exclusive with Bullard, give hard hats and caps an extra margin of protection without adding weight. Only from Bullard do you get the girder-like protection of three ribbed construction and 33% greater impact protection* than is offered by the ten leading types of safety hats. Available in fiber glass and aluminum in a wide choice of colors.

SMOOTH CROWN OR HATS WITH LOW RIDGES

An overhead blow can cause the unreinforced crown to depress. This allows the impact of the blow to touch the top of your skull causing concussion, a fracture or even death.



HIGH RIBBED BULLARD HATS

Here the girder-like strength of the three ribs cuts down the chances of crown depression, but if there is any depression, the added depth provided by the rib still protects your skull from making contact with the full impact.



*From Report B1-R6, helmet comparative impact performance data for 1 1/4" crown clearance (8 lb. drop ball test).

E. D. BULLARD COMPANY Sausalito, California



**SAFETY
ENGINEERED**

... on scrapers ... dozers ... in
all severe scraper wagon service ...



WIRECO Super-Flex Scraper Cable gives SAFE, STEADY SERVICE!

Scraper service deals severe punishment to wire rope. Nobody knows this better than the construction people who are faced with the continual need for a scraper rope that withstands sharp bends, rubbing on sheave housings and fouling on drums that cost yardage and profit!

Because of its construction, WIRECO Super Flex is

Flexible! ... to take the sharp bends and abuse in stride! It's pliable for easy handling ... will wind smoothly on drums. Because of this freer movement through sheaves and drums it affords faster handling in loading and unloading ... means more yardage moved in less time with less effort ... and, naturally, a better job profit!

Abrasion resistant! ... to perform under all kinds of adverse conditions! The stamina and staying power of Wireco and Brown Strand are bred into the Super-Flex! It thrives on rough going ... gives you longer, more satisfactory service life!

In TODAY'S CONSTRUCTION BUSINESS the wire rope you use may be the difference between capital success and capital failure. With so much riding on the rope that equips your scraper or dozer, it makes sense to buy the best scraper rope in the business. Wireco has the best ... **ENGINEERED** to the demands of YOUR job!

ASK YOUR WIRECO DISTRIBUTOR!



**WIRECO SCRAPER
CABLE** comes
conveniently
wound on
scraper reels
ready for fast
easy mounting!



WIRE ROPE CORPORATION OF AMERICA, Saint Joseph, Missouri



... for low-cost land improvement



**RAKE
STACK
CARRY**

with the NEW

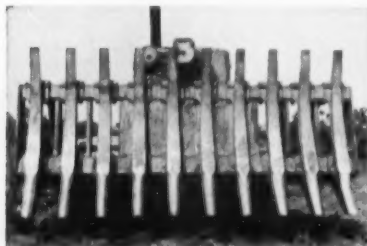
FLECO-TRAXCAVATOR RAKE!

Add a new dimension to your land clearing operations — and new usefulness to Cat No. 977 or 955 Traxcavators! In just a few minutes you can convert your Traxcavator into a highly efficient land clearing machine. You can *push* out rocks, stumps, roots and trees — carry the material to trucks or piles for disposal. You can rake out debris that interferes with compaction and scraper or grader work.

With Bumper Bar at high lift and

forward tilt position, maximum leverage is provided for pushing trees over. Curved teeth comb roots and brush from the ground. Traxcavator tip-back lift arm feature tilts teeth to carry a full load and stack it, if desired, rather than push it along the ground.

Your Fleco-Caterpillar Dealer will gladly help you analyze your over-all land clearing operation and recommend the equipment you need most. See him for facts on Fleco-Traxcavator Rakes!



Fleco Multiple-Application Rake for the mighty D9 pushes out, rakes and stacks trees, roots, stumps, rocks.



Fleco Detachable Stumper concentrates power on stump. Knockdown beam hits tree high for maximum leverage.

**FLECO
CORPORATION**

Jacksonville, Florida

ROCK, ROOT & BRUSH RAKES
TREE CUTTERS • UNDERCUTTERS
CAB GUARDS • ROOT CUTTERS
DETACHABLE & PULL STUMPERS
TREDOZERS • ROLLING CHOPPERS
HEAVY-DUTY TOOL BARS



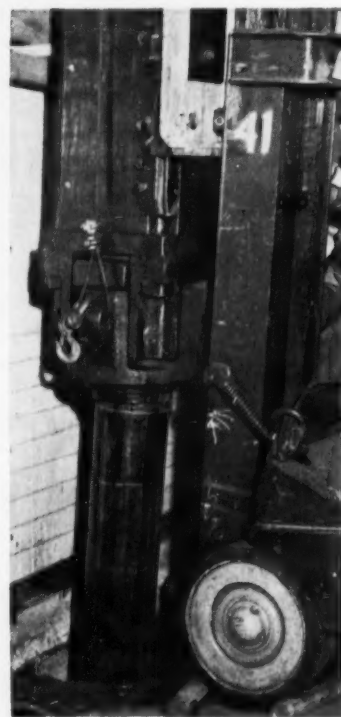
JOB TALK . . .

continued

of the first of its type in the world. But behind the scenes, welded studs play an important role in speeding the building towards completion.

General Bronze Corp., sub contractor to George A. Fuller Co. of New York for erection of the curtain wall uses $\frac{3}{4}$ by 3-in. steel threaded studs welded to the building's spandrel beams to secure brackets from which curtain walls hang. The studs are placed over the top flange of the steel beam in rows of four. To place the studs, the contractor uses KSM's new Mark XI electric stud welder. After studs are placed, a bracket is slipped over them into place and bolted tight.

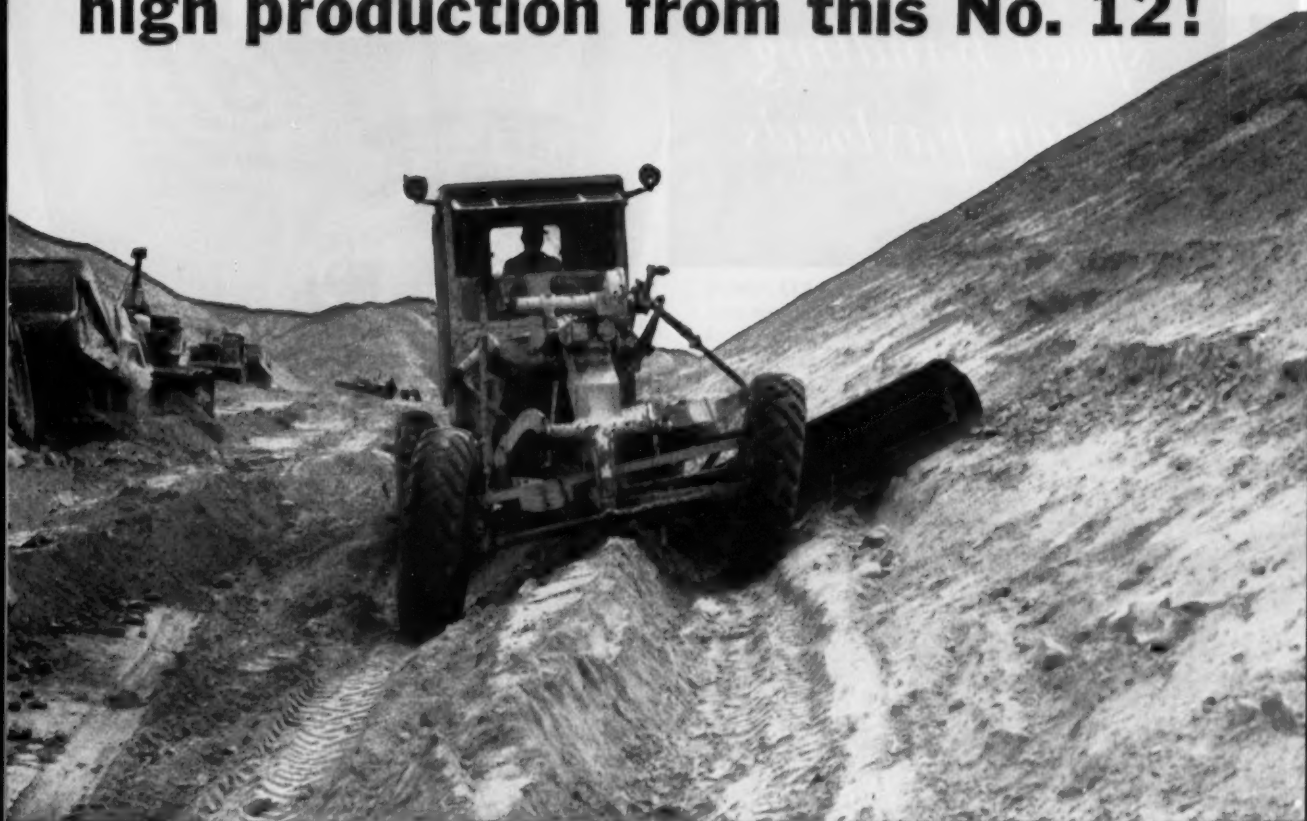
This bracket supports vertical mullions.



Pile Driver Nuzzles Wall

How do you drive piles a foot or less away from a wall when you have nothing in the way of room to move around? Just mount a hammer on a fork lift truck from which the forks have been removed. You can bring the rig right in against the wall and drive pile sections home with ease.

Why Mr. Thorn expects and gets high production from this No. 12!



Besides bank sloping, this Cat No. 12 Motor Grader maintains haul roads for DW21s and DW10s on the 9.2-mile realignment of U. S. 91 near Mesquite, Nevada. Note D8 in background.



PAUL A. THORN

"We have owned Caterpillar products since 1927," says Paul A. Thorn, President of Thorn Construction Co., Inc., Springville, Utah. "We're firm believers in them because of economy, minimum down time, long life and constant engineering improvement. We also think that Caterpillar Dealer service is in a class by itself."

Speaking from 29 years of successful experience, Mr. Thorn now has a Caterpillar line-up that includes thirteen D8s, five DW21s, two DW10s, seven Diesel Engines, one Diesel Electric Set and six No. 12s. This No. 12, with 9999 hours on its hour meter, was part of the company's rugged yellow team on a 9.2-mile realignment of U. S. Highway 91. The contract involved moving 1,500,000 cu. yd. of dirt. Working 10 hours a day, 5 days a week, the No. 12 contributed its full share to money-making production.

Now an even more productive CAT* No. 12 Motor Grader

As good a machine as this "old" No. 12 has proved itself, there's even *more* work at *lower* cost with *less* down time built into the new No. 12. Constant engineering improve-

ment is the reason. For example, the new No. 12 has an exclusive oil clutch that can operate up to 1500 hours without adjustment. New tubeless tires, now standard, save time and money by eliminating an estimated 80% of down time due to tube and flap repair and by providing longer tire life. These and other features add up to a new standard of grader performance!

Another point well worth considering: your Caterpillar Dealer backs you with prompt service whenever and wherever you need it. He has the trained mechanics and parts to do the job *fast* and *right*. See him for complete facts about the practical, advance-design features of the No. 12. Name the date—he'll be glad to demonstrate!

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR*

*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

**99% OF ALL
CAT MOTOR GRADERS
ARE STILL IN USE**

ROADRANGERS

*speed handling
45-ton payloads*



This Fisher LOADMOR hopper train is 54' 6" long; has a GCW of 120,000 lbs. Reo V-8 Tractor is equipped with R-46 Fuller 8-speed semi-automatic ROADRANGER Transmission.

Where maximum payloads run up to 45 tons, Fisher Sand & Gravel uses 2 Reo Tractors equipped with 8-speed R-46 Fuller ROADRANGER Transmissions pulling double-bottom trains.

Says Bill Fisher, President: "The Reo V-8, together with the 8-speed Fuller ROADRANGER Transmission,

give us ideal performance. The R-46 ROADRANGER is particularly suited to our operation because of the short length of the transmission, the even steps between gear ratios, and the lighter weight as compared to main transmission and an auxiliary or 2-speed axle. The faster shifts and the short even steps between gear ratios are a big advantage because of the high GCW on adverse grades. Each of the Reos has accumulated 70,000 miles of trouble free service."

Fisher Manufacturing, Inc. of Mt. Pleasant, Michigan, builds the double-

capacity super-haul trailers used by Fisher Sand & Gravel Company, Midland . . . and markets them to other aggregate hauling firms as well.

Does your application call for an easy-shifting, shorter, lighter-weight, higher capacity transmission . . . with short even steps between ratios to keep engine rpm in the maximum hp range? Check with your truck manufacturer or dealer for the right Fuller ROADRANGER for your job, or write Fuller Manufacturing Company (Transmission Division) Kalamazoo, Michigan.

FULLER



TRANSMISSIONS

Unit Drop Forge Division, Milwaukee 1, Wisconsin • Shuler Axle Company, Louisville, Kentucky (Subsidiary) • Sales & Service, All Products, Western District Branch, Oakland 6, California and Southwest District Office, Tulsa 3, Oklahoma.

NTS PEN

Manuf
2149 N
1017 C

ESCO
New Y
at 420
Portlan

Other
Los An
San Fr
Seattle
Housto
Eugene
Salt Lak
Denver
Honolu
In Can

INCREASE YARDAGE

DIG FASTER...DUMP CLEANER...LAST LONGER

Any way you look at it — from any angle — it's the taper that makes ESCO dragline buckets dig faster, dump cleaner, and last longer.

DIG FASTER. Bucket sides flare outward from the lip to increase loading speed. Materials are not compressed into the opening but allowed to expand and flow up and back along the tapered sides filling the bucket completely without voids in the rear. Bucket fills in shorter drag distance — less line pull required.

DUMP CLEANER. Taper from front to rear and outward flare from lip to arch allows load to drop quickly and easily from the bucket. Load dumps clear of high tubular arch.

LAST LONGER. Tapered design reduces loading and dumping friction to an absolute minimum. Bucket lasts longer. All welded construction and the maximum use of alloy steel castings makes a high strength-to-weight ratio resulting in "lower cost per yard operation".

SIDES tapered top to bottom

SIDES tapered front to back

WITH *ESCO* TAPERED DRAGLINE BUCKETS

ESCO Tapered Dragline Buckets have been proved by thousands of hours of operation all over the world.

Bring your bucket problems to ESCO, your bucket specialists. ESCO will "job-tailor" a bucket to your operation. Ask your nearest ESCO dealer for complete details today, or write direct.

BOTTOM tapered front to back

Manufacturing Plants
2149 N. W. 25th Ave., Portland 10, Ore.
1017 Griggs Street, Danville, Illinois

ESCO International
New York Office
at 420 Lexington Ave., New York City, or
Portland Manufacturing Plant

Other Offices and Warehouses:
Los Angeles,
San Francisco, California
Seattle, Spokane, Washington
Houston, Texas
Eugene, Oregon
Salt Lake City, Utah
Denver, Colorado
Honolulu, Hawaii

In Canada, ESCO Limited



ELECTRIC STEEL FOUNDRY CO.

"My Footage went up better than 20%"



From border to border, from coast to coast
Users of ESCO Buckets on other jobs say —

...says VINCENT DEL BROCCO, Del Brocco Contracting Ltd. of Toronto, Ontario, Canada

"I converted my Northwest 41 over to use an ESCO 1-yard Fastback® Hoe, cutting a 36-inch trench. My footage went up better than 20% and thanks to ESCO sharp points, I can dig shale and hardpan without shooting. For more feet of trench a day I prefer the ESCO hoe with adapters and sharp points."

ESCO has a Hoe Bucket of the right shape and size for your machine and for your kind of digging. Call your ESCO dealer today. He will show you how you can increase your footage... cut your production costs.

Manufacturing Plants
2149 N. W. 25th Ave., Portland 10, Ore.
1017 Griggs Street, Danville, Illinois

ESCO International
New York Office
at 420 Lexington Ave., New York City, or
Portland Manufacturing Plant

Other Offices and Warehouses:
Los Angeles,
San Francisco, California
Seattle, Spokane, Washington
Houston, Texas
Eugene, Oregon
Salt Lake City, Utah
Denver, Colorado
Honolulu, Hawaii

In Canada, ESCO Limited



**ELECTRIC STEEL
FOUNDRY CO.**



"I have dug 150,000 feet of trench with this ESCO hoe bucket and so far am unable to detect any appreciable wear on the lip," says R. K. Nickerson, Contractor, Goldendale, Washington.



"We have three ESCO Hoe Buckets in use and have found them to be designed and built for the rugged use we must put them to in excavating this coral rock which must be dug without shooting. I like the long radial sweep of the bucket as it really gets through there without heeling in," says Superintendent Bill Crews for R. H. Wright & Son at Ft. Lauderdale, Florida.



THE BUFFALO-SPRINGFIELD K-45 KOMPACTOR

How to select compaction equipment

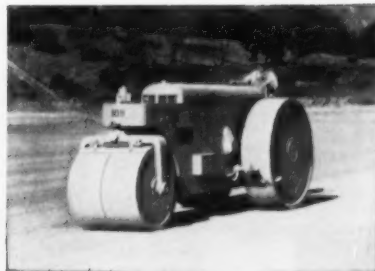
The logical question to ask yourself when you are ready to buy new compaction equipment is: "Exactly what do I need the equipment for and how will I use it?"

BASE FILL COMPACTION—This type of compaction demands equipment that will handle a wide variety of materials, give you the highest degree of compaction with the fewest passes. Buffalo-Springfield's revolutionary K-45 Kompactor is proving a real money-making answer for this type of work. It is self-propelled, relies on the "Interrupted Pressure Principle." All compaction effort is directed downward. Contractors testify they are meeting density requirements in one-fourth the time normally required with other compaction equipment.

FINE GRADE FINISHING—Buffalo-Springfield offers six 3-wheel rollers, ranging in capacity from 5 to 15 tons, to handle the large variety of materials found in fills, subgrades and unfinished bituminous pavements. The variable-weight 3-wheel roller is ruggedly built for years and years of hard, maintenance-free work.

Buffalo-Springfield's thoroughly-proved 3-axle tandem "walking beam" roller provides up to 60% greater tonnage compacted per day in superhighway construction, airport and military establishment jobs where specifications are extra strict.

ASPHALT FINISHING—Two-axle Tandem Rollers are designed especially for all surface finishing jobs. Ranging from 5 to 16 tons, Buffalo-Springfield Tandems are used for



3-WHEEL ROLLERS

heavy-duty highway and public works projects, and all types of finishing, maintenance and repair work. A wide selection of models for the biggest to the smallest jobs are designed for long-life and profitable operation.



TWO AXLE TANDEM

SHORT ROLLING JOBS—Buffalo-Springfield's 3-5 ton portable roller is widely used for rolling driveways, sidewalks, parking and playground areas, and for patching and light fin-



3-5 TON PORTABLE TANDEM

ishing jobs. It is highly maneuverable and portable from job-to-job. Write today for full information on the type of equipment you need—or see your nearest distributor for an on-the-job demonstration.

THE BUFFALO-SPRINGFIELD KX-3 AXLE TANDEM



BUFFALO-SPRINGFIELD
Roller Division-Koehring Company
SPRINGFIELD, OHIO

How much will it lift?

Check Koehring capacities:

(Crawler ratings based on 75% of tipping load.
Rubber-tired machines — 85% of tipping load.)

205 CRAWLER	(½-Yd.)	20,000 lbs.	at 10-ft. radius
205 ON RUBBER	(½-Yd.)	30,000 lbs. 14,600 lbs.	at 12-ft. radius at 20-ft. radius
305 CRAWLER	(¾-Yd.)	30,000 lbs.	at 12-ft. radius
305 ON RUBBER	(¾-Yd.)	50,000 lbs. 15,800 lbs.	at 10-ft. radius at 30-ft. radius
405 CRAWLER	(1-Yd.)	40,000 lbs.	at 12-ft. radius
445 ON RUBBER	(Crane Only)	90,000 lbs. 40,000 lbs.	at 15-ft. radius at 25-ft. radius
605 CRAWLER	(1½-Yds.)	72,300 lbs.	at 12-ft. radius
805 CRAWLER	(2-Yds.)	104,200 lbs.	at 12-ft. radius
1205 CRAWLER	(3-Yds.)	190,000 lbs.	at 12-ft. radius

Want more information? Call Koehring distributor today.



KOEHRING DIVISION OF KOEHRING COMPANY, Milwaukee 16, Wis.



With Koehring 305 truck crane on this job, contractor is equipped to lift up to 25 tons on 30-foot boom. When extra reach is needed, crane handles maximum 100-foot boom plus 30-foot jib with low A-frame.

CK754

145 batches an hour on airport paving job

Supplying two 34-E pavers at new airbase, this Johnson one-stop automatic plant weighed out 1669 batches during an 11½-hour peak period—averaged over 145 batches hourly. Each 1.38-cu. yd. batch consisted of 5 materials: sand, 2 aggregates, 2 types cement. Johnson plants are available with multiple arrangements of single-material batchers, automatic push-button control, graphic weight-recording for any 1, 2 or 3-stop operation.

C. S. JOHNSON • Champaign, Ill.
(Koehring Subsidiary)



Producing concrete for foundation footings

When contractor was ready to pour footings he saved time and money by mixing his own concrete on the job — had the concrete just when he needed it. This Kwik-Mix 11-S is available on 2 or 4 wheels, with side or end discharge — has double-mixing action, automatic water system, tilted Flow-Line discharge, optional Batchmeter. Other sizes — 3½-S to 16-S. Also: plaster-mortar, bituminous mixers, material-handling Moto-Bugs®.

KWIK-MIX • Port Washington, Wis.
(Division of Koehring Co.)



Speeds installation of telephone cable

Opening trench 4 to 5 feet deep, 24 inches wide, for underground cable system, Parsons 150 wheel Trenchliner® averaged 1026 lineal feet an hour through rough, wooded country. It's a heavy-duty, high-production ditcher, digs 16 to 26 in. wide, at depths to 5¾ feet. Has hydraulic wheel-hoist, controlled discharge, quick-change buckets, optional tile-layer. Check Parsons line for any trench 8 to 72 in. wide, 19 ft. deep.

PARSONS • Newton, Iowa
(Division of Koehring Co.)



A70

How the Du Pont Anti- save you work,



1. Pick the best!

Photograph above shows why your costly equipment is safest when you winterize with Du Pont Zerone® or Zerex® anti-freeze.

Flask "A" contains a solution of ordinary anti-freeze with an oil inhibitor. Flask "B" contains a solution of "Zerex" with Du Pont's exclusive chemical inhibitor. To each was added the same amount of ground rust. Flasks were shaken and contents poured. Notice how film of rust clings to the inside of Flask "A" just as it would to cooling system. But Flask "B" with "Zerex" is clean—rust particles stayed in suspension—drained out with the solution. Du Pont's chemical inhibitor will never form an oily film of rusty sludge that could clog radiators, causing overheating and serious engine damage.

This is just one of the many advantages you get when you protect your equipment from freeze-ups, rust and corrosion with either "Zerone" or "Zerex" anti-freeze. Pick the Du Pont anti-freeze best suited to your needs and you have taken the first step in the anti-freeze preventive maintenance plan—that will save you work, time and money.



2. Pre-mix your anti-freeze

Both "Zerone" and "Zerex" will mix completely in water, and the rust inhibitor will not separate from the solution while standing. This permits you to pre-mix your anti-freeze solution to any degree of protection desired for use when and where you need it.

Stock your pre-mixed anti-freeze in any convenient place. It will keep indefinitely—always ready to use.

When anti-freeze is pre-mixed, installations can be made rapidly by unskilled help and without the need for individual time-consuming hydrometer checks. What's more, guesswork and the chance of costly overprotection are avoided—and pilferage problems are discouraged.

Take advantage of the total savings possible when you pre-mix with Du Pont "Zerone" or "Zerex"—the quality anti-freezes that can be pre-mixed with water to stay!

Freeze **PM** Plan can PREVENTIVE MAINTENANCE time and money!



3. Use the "Zerex" Test Kit

Thousands of dollars' worth of equipment is ruined each year because winter-worn anti-freeze is left in the cooling system to turn acid and cause rust and corrosion.

Now for the first time Du Pont makes it possible for you to tell — right on the job — which "Zerex" anti-freeze solutions are safe to re-use and which are worn out and should be replaced with a fresh "Zerex" solution. In this way, you can reduce cooling system maintenance expense and cut your "Zerex" anti-freeze costs in half!

And remember, *only* "Zerex" anti-freeze can be safely analyzed — on the job — with the exclusive "Zerex" Anti-Freeze Test Kit. This new method for testing reserve alkalinity in "Zerex" anti-freeze is a development of Du Pont research. It helps make possible an anti-freeze preventive maintenance plan that will save you anti-freeze and cut your operating costs.



*Your best
anti-freeze buy!*

Note to maintenance supervisors and anti-freeze buyers: When you consider the value of the equipment you use, the investment your anti-freeze must protect and the expense of needless downtime, an efficient anti-freeze preventive maintenance plan makes good business sense.

The continuing savings made possible with "Zerone" and "Zerex" and an Anti-Freeze PM Plan far outweigh any momentary saving you might gain by using anti-freeze products of questionable performance and low initial cost.

Contact your Du Pont anti-freeze supplier or mail the coupon today — start saving now with the Du Pont Anti-Freeze PM Plan.



REG. U.S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING...THROUGH CHEMISTRY

E. I. du Pont de Nemours & Co. (Inc.)
"Zerone", "Zerex" Section, Nemours 2420
Wilmington, Delaware

CME 6

Please send me more information about the Anti-Freeze PM Plan.

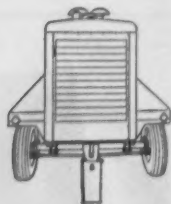
Name _____

Address _____

City _____ State _____

Company name _____ Title _____

**the newest, most advanced
air compressor available!**



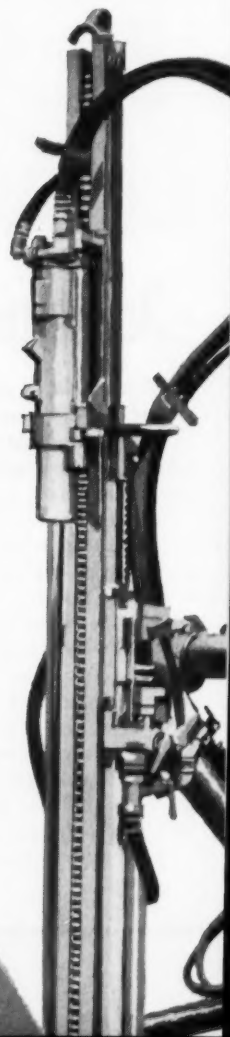
Here's the rotary air compressor you've wanted — one designed with the operator in mind! It's a regular tornado on wheels — delivering a full 600 cubic feet of air per minute compressed to 100-120 lbs. pressure. And talk about economy — the automatic governor speed control permits the engine to loaf — saves fuel by the barrel!

The Le Roi Rotary 600 is a product of advanced engineering developed and perfected with the highest degree of care.

It features unit construction, allowing major components to be removed, repaired, and replaced without removing adjacent assemblies. This practical design simplifies maintenance, reduces overhaul cost.

LE ROI ROTARY 600... THE

LIGHTWEIGHT - COMPACT - RUGGED -



It includes every modern compressor feature as an *integral* part of the design—not as added modifications.

For instance, a hydraulic positive-acting clutch is incorporated in the basic design to permit running the engine alone, thus increasing both engine *and* compressor life. Details like this and many others raise the Le Roi Rotary 600 to a class by itself.

As a result, it *delivers* air with the greatest efficiency and economy possible — with a machine whose operation and servicing establish new standards of simplicity for air compressors.

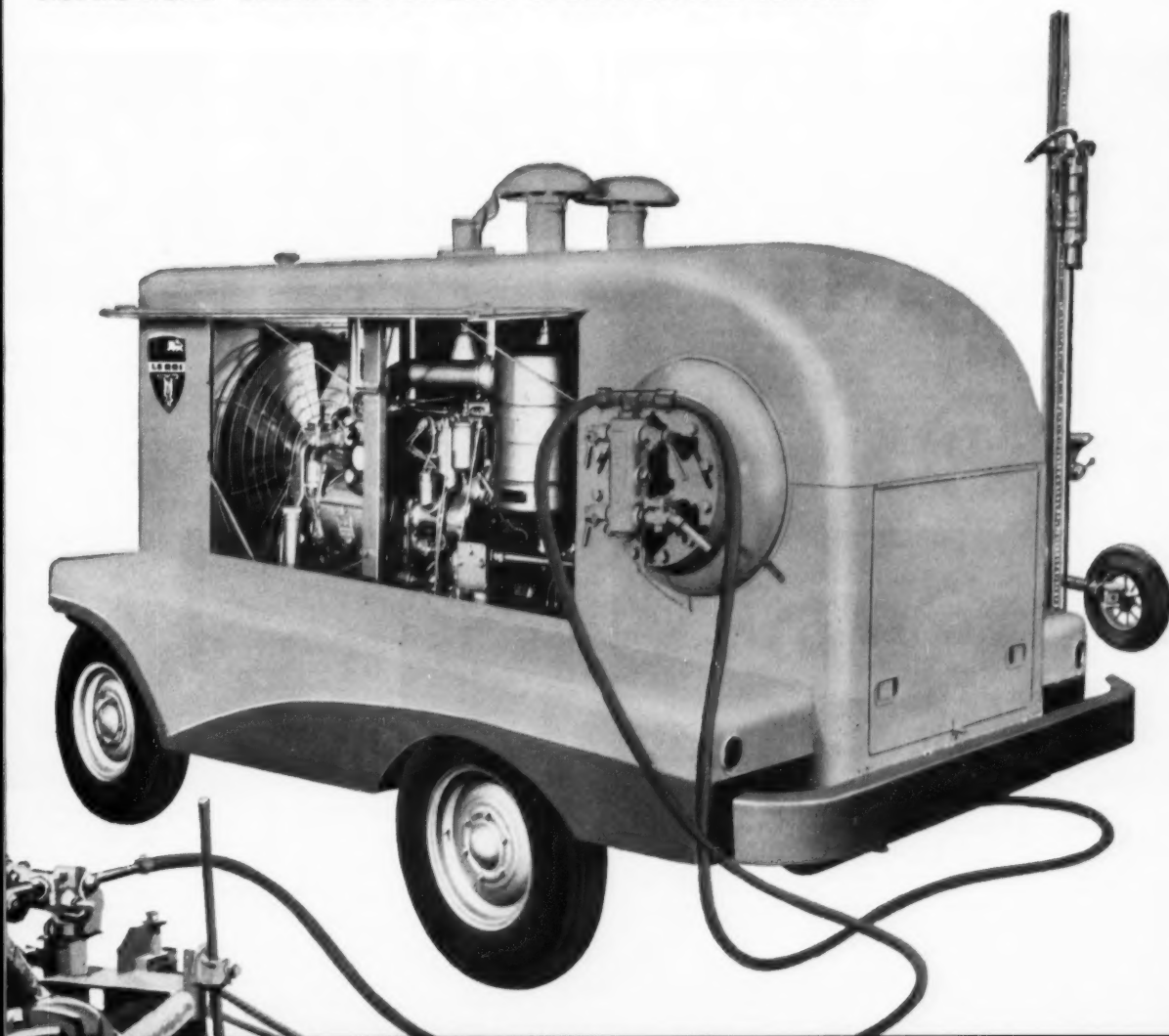
Turn the page and check all the features of the Le Roi Rotary 600 — they mean more air at less cost to you!

SPECIFICATIONS:

Capacity (free air)	600 cfm
Discharge pressure	100 psi
Full load speed	1800 rpm
Engine	GM 671 — 6 cyl.
Length	12 ft. 6 in.
Width	6 ft. 8 in.
Height	7 ft. 5 in.
Weight (dry)	7750 lbs.
Tires (4)	7.50 x 16 8 ply
Fuel cap.	82 gal.

NEWEST WITH THE MOST!

ECONOMICAL — DESIGNED FOR EASY OPERATION AND SERVICE



LE ROI ROTARY 600 AIR COMPRESSOR



LOOK AT THESE

LE ROI ROTARY 600

FEATURES...

COMPARE THEM

WITH ANY OTHER

ROTARY—

Two-stage, efficiently oil cooled rotary air compressor.

It's the lightest rotary in the 600 class — 7750 lbs. dry weight. That means economical hauling, easy on-site positioning, easy handling over rough or muddy ground.

Powered by a standard GM 671 diesel engine with 12 volt electric starter and cold weather ether starting device.

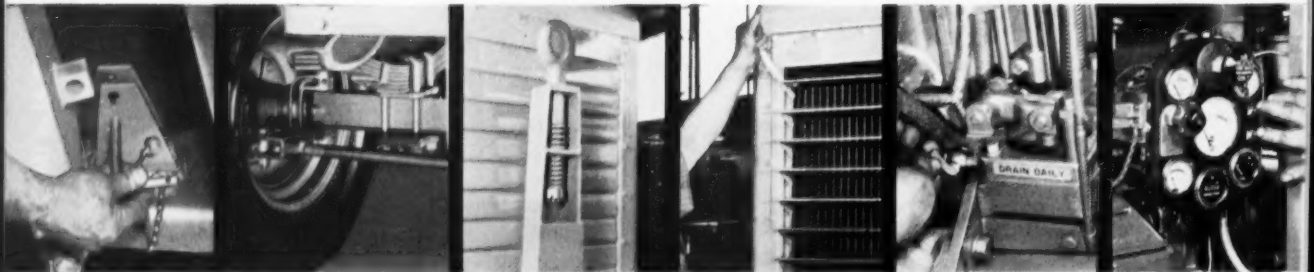
High capacity — a full 600 cfm compressed to 100 psi @ 1800 rpm.

Automatic governor speed control permits engine to loaf at less than $\frac{1}{3}$ rated speed when compressor is unloading — a major fuel saver!

Engine and compressor have 3-point cushioned mounting which absorbs shock, cuts maintenance that might be caused by travel over rough terrain.

Compressor reaches 110 psi within ten seconds of start.

ONLY LE ROI GIVES YOU A



1 It's easy to lift and lock the towing tongue in the up position, with a positive lock type pin, at the job site or when storing the unit.

2 Positive automotive-type steering with a 12-foot turning radius and 7.50 x 16 8 ply tires makes it easy for you to tow the compressor to any working site.

3 The compressor has a fabricated welded steel tow-tongue with a built-in spring loaded towing eye designed to absorb the severest road shocks.

4 Diesel engine has pressurized cooling system, efficient at high altitudes, with 12 manual vane-type shutters for close adjustment of temperature control. One handle opens shutters to any position.

5 An automatic speed control system maintains constant, even air pressure at all times. A drain valve is provided to remove water daily from the system.

6 The unit is quickly started by pushing down with two fingers at the same time on the fuel and starting engine switches conveniently located on the "working-side" instrument panel.



7 The unit has a handy metal box to store tools located inside the housing at the rear of the compressor. Tools may be stored at all times inside lockable housing doors.

8 A large, easy-to-open rear door can be locked in the up position offering better accessibility to the compressor. Operating instructions are conveniently located inside the door.

9 All six housing door latches can be opened with one finger, yet they securely hold doors locked when the doors are shut. Latches are flush-type — won't break off.

10 It takes only a minute to fold the lower door over the upper hinged half of the door and secure it in the open position with sturdy steel door braces.

11 Excessive receiver air pressure is released through a safety valve by a manually controlled wire trip located outside of the housing for added operating safety.

12 There are six 1 in. and two 2 in. service openings on the air receiver manifold with more than enough outlets to connect air lines to. There are four manual service valves and a drain valve.



13 Large low-set working height fenders provide plenty of room to place tools and parts when servicing your unit.

14 There's an oil reservoir cage to check oil capacity. An oil filter pipe on the reservoir is accessible through a lockable rear door.

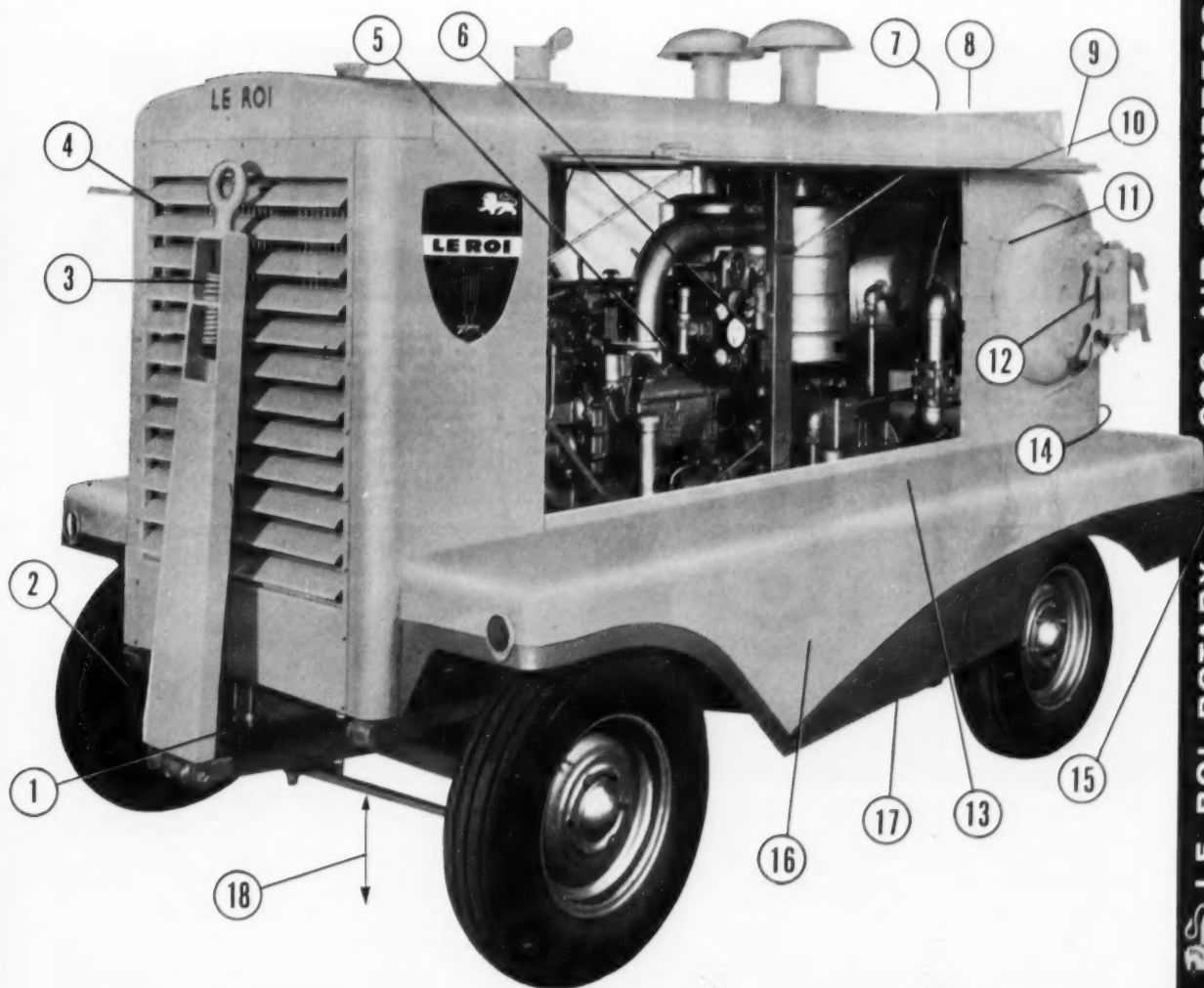
15 Rotary has a heavy gage molded steel bumper for added protection to the rear housing along with two glass reflectors to warn traffic of its presence.

16 41 gallon fuel tanks fully enclosed under each fender, safe from engine-compressor heat, distribute weight evenly. Permanently inter-connected, filled easily from either side — an operator convenience.

17 The heavy duty welded steel underframe is designed and built to withstand punishing treatment over the roughest terrain.

18 The 600 Rotary was designed for high clearance with a low center of gravity for easy towing over steep inclines and rough terrain.

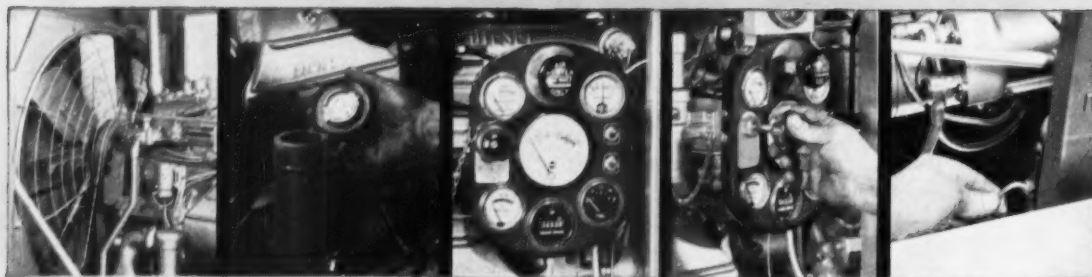
ALL THESE ADVANTAGES !



600 AIR COMPRESSOR

LE ROI ROTARY





1 A steel wire shroud completely encloses a high velocity 8-bladed fan for added safety to the operator.

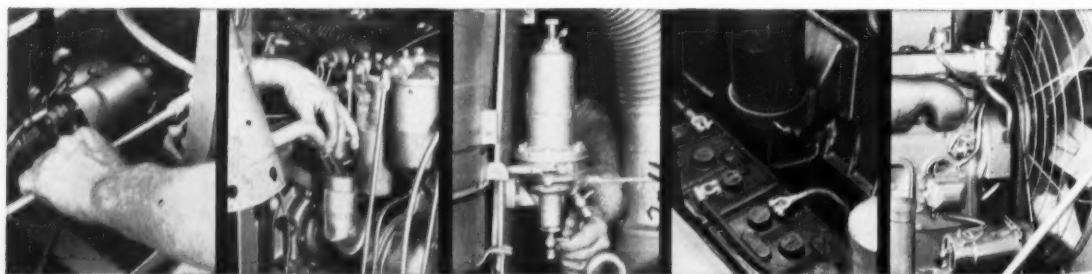
2 It's easy to fill each 41 gallon fuel tank with the filler pipe located fender-high and inside the lockable side doors of the housing. 82 gallons of fuel means "full-shift" capacity.

3 All compressor controls are grouped on central instrument panel which contains ether engine starting; engine-stop handle; starting and fuel switches; temperature, fuel, oil, air pressure, hourmeter, and amperage gages; and engine heater control.

4 The instrument panel has manual control handle that pulls out to quickly stop the unit from operating.

5 The clutch pump bypass valve is open while the clutch is engaged. All you have to do is close the valve when you want to disengage the clutch.

LE ROI DESIGN MEANS TOP



6 A handle is provided to pump oil to the clutch to disengage the engine drive from the compressor for easier starting and engine warm-up. This system also allows engine adjustment while operating without any compressor load.

7 Working-side location of the engine oil filler pipe is another feature making it easy for the operator to replenish engine oil.

8 A precision built pressure regulator automatically controls compressor speed and regulates air pressure in the receiver. Two drain valves are accessible from either side to remove water daily from the regulator.

9 A 12-volt battery system located next to the fender makes it easy for the operator to check the battery fluid and battery cables. With its compact housing design it's also easier for you to reach in and change the engine oil filter.

10 The engine generator, voltage regulator, oil pressure and water temperature controls are easy-to-get-at for servicing.



11 Two large capacity air intake cleaners supply plenty of filtered air to the compressor and engine. A heavy duty engine muffler directs exhaust out through the top of the housing.

12 Water is easily removed from the air intake manifold by a drain valve conveniently located on the manifold and accessible from the side of the unit.

13 You can easily remove, inspect and replace clutch discs from outside the compressor through hand-hole openings provided in the clutch housing. No engine or compressor disassembly is needed.

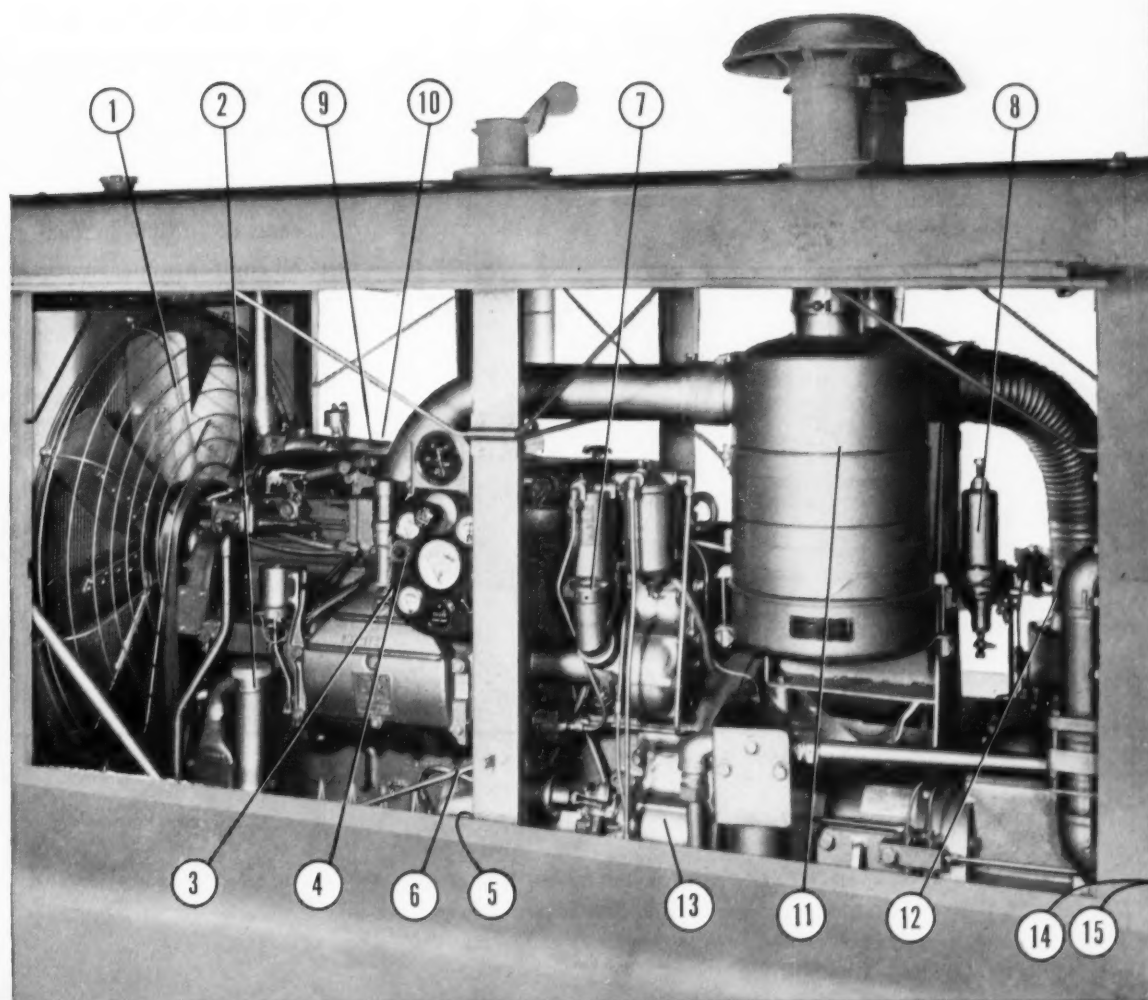
14 Rotor vanes can be inspected within a few minutes — right in the field. By removing eleven capscrews and the end cover from the compressor cylinders, rotor vanes can be pulled out for inspection or replacement.

15 It's easy to remove the oil pump from the compressor. Remove a few capscrews and the pipe connection to pull out the oil pump assembly — this can be done in a matter of minutes.

Under the hood, the Le Roi Rotary 600 is packed with superior design features you can't see, but that show up best in low maintenance costs and dependable performance. For instance, all housing assemblies are doweled and step-fitted to give perfect alignment and insure minimum distortion between parts even in the toughest service on rough, broken ground.

Roller bearings are used throughout the compressor for long life. Quiet, helical gears run in a constantly changing filtered oilbath. Points like these — and many more — are typical of the quality that makes the Le Roi Rotary 600 an outstanding buy! You'll find that no other compressor can match this new Le Roi unit in advanced design and top performance features.

QUALITY INSIDE, TOO!



LE ROI ROTARY 600 AIR COMPRESSOR



**The Le Roi Rotary 600 is like no other
compressor built. It's the
modern unit... tomorrow's compressor**

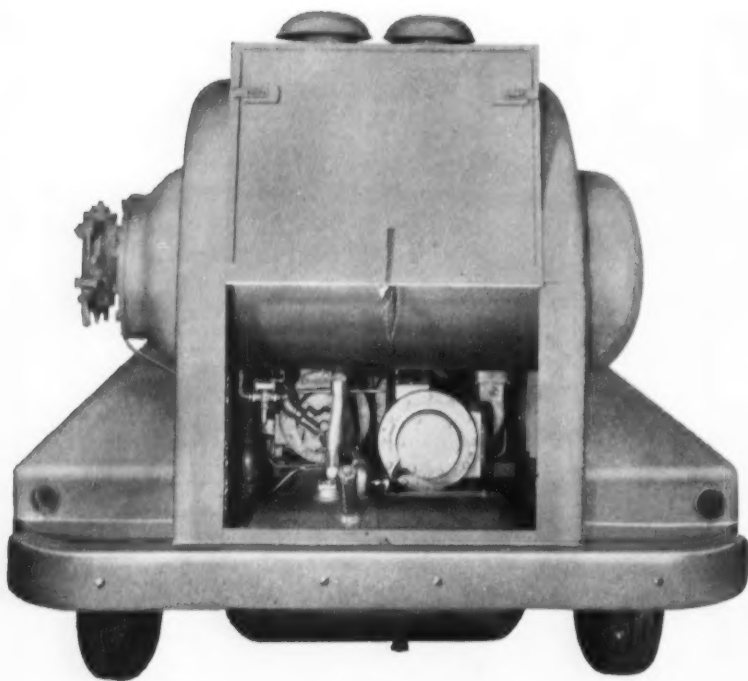


available today! See it yourself... try it...

you'll buy it if quality and

economy are your watchwords

UNIT CONSTRUCTION...



**The Le Roi Rotary 600
Is the Only Rotary Built
With Unit-Construction,
Side-By-Side
Individual Cylinders!**

That means:

- ... short down-time on repairs!
- ... all components easily removable without disassembly of other parts!
- ... unit can be serviced and maintained in the field!
- ... can be serviced with the simplest mechanic's tools: screwdriver, pliers, crescent wrench!
- ... no bearing puller needed!
- ... periodic vane inspection is easily accomplished in minutes instead of hours!
- ... component parts are less expensive, replacements are low-cost items!



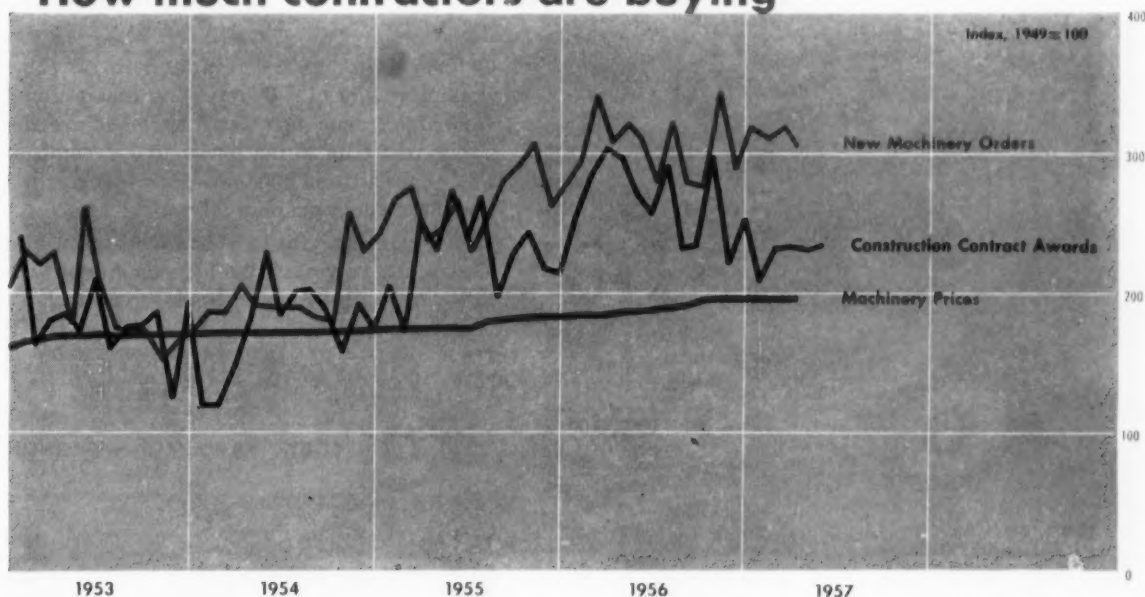
LE ROI DIVISION • Westinghouse Air Brake Co.
MILWAUKEE 1, WISCONSIN

Manufacturers of Newmatic air tools, portable and Tractair® air compressors, stationary air compressors, and heavy-duty industrial engines. Write us for information on any of these products.



Construction Machinery Price Trends

How much contractors are buying



Price Index

	APRIL 1957	MONTH AGO	YEAR AGO	PERCENT CHANGE 1956-'57
All Types of Equipment t	157.5	156.8	144.8	+ 8.8
Cranes, Draglines, Shovels	159.3	158.0	145.7	+ 9.3
Shovel, 1/2 cu yd	151.6	150.3	141.5	+ 7.1
Shovel, 3/4 cu yd	162.9	160.2	149.2	+ 9.2
Shovel, 1-1 1/2 cu yd	167.9	167.9	154.1	+ 9.0
Shovel, 2 cu yd	143.7	141.3	131.3	+ 9.4
Shovel, 3-3 1/2 cu yd	154.1	154.1	139.9	+ 10.2
Shovel, 6 cu yd	173.2	170.9	153.6	+ 12.8
Crane, truck mounted	162.5	161.0	153.7	+ 5.7
Bucket, clam shell	152.7	152.7	134.6	+ 13.4
Bucket, dragline	180.8	180.8	160.0	+ 13.0
Crane, tractor mounted	126.6	126.6	120.3	+ 5.2
Scrapers and Graders	150.1	148.9	138.4	+ 8.5
Scraper, 4 Wheel, 8-8.4 cu yd	155.0	145.2	132.9	+ 16.6
Scraper, 4 Wheel, 14.4-15.2 cu yd	143.9	140.6	128.0	+ 12.4
Scraper, 2 Wheel	113.6a	113.6a	107.0a	+ 6.2
Grader, heavy duty	154.9	154.1	143.6	+ 7.9
Grader, light & medium	152.2	152.2	140.9	+ 8.0
Tractors	169.3	168.9	156.0	+ 8.5
Wheel type, off-highway	118.6a	118.6a	111.2a	+ 6.7
Crawler type, 37.0-45.1 dhp	172.3	171.9	154.7	+ 11.4
60.5-75.0 dhp	176.6	174.8	158.1	+ 11.7
102.0-116.0 dhp	172.3	172.3	159.6	+ 8.0
126.0-155.0 dhp	178.3	178.0	165.5	+ 7.7
Machinery, Tractor Mounted	155.2	154.3	142.0	+ 9.3
Dozer, cable control	149.0	149.0	146.3	+ 1.8
Dozer, hydraulic control	170.6	169.8	151.3	+ 12.8
Cable, power control unit	139.9	136.6	129.8	+ 7.8
Loader, shovel type	146.7	146.5	132.6	+ 10.6
Specialized Machinery	144.6	142.5	133.8	+ 8.1
Ditcher	151.8	151.8	140.8	+ 7.8
Roller, tandem	181.7	172.8	158.3	+ 14.8
Roller, 3 wheels	154.8	148.6	139.3	+ 11.1
Ripper and rooter	138.1	132.8	121.8	+ 13.4
Dewatering pump, 10 M gph	108.1	108.1	105.4	+ 2.6
Dewatering pump 90 M gph	133.3	133.3	124.3	+ 7.2
Portable Air Compressors	146.2	146.2	133.2	+ 9.8
Contractors Air Tools	150.0	150.0	135.7	+ 10.5
Mixers, Pavers, Spreaders	142.5	142.3	133.3	+ 6.9
Mixer, port., 11 cu ft	151.7	151.7	145.3	+ 4.4
Mixer, port., 16 cu ft	153.6	153.6	144.8	+ 6.1
Mixer, truck, 4 1/2 cu yd	122.1	122.1	113.7	+ 7.4
Mixer, paving, 34 cu ft	171.8	166.8	153.7	+ 11.8
Concrete finisher	166.3	166.3	158.0	+ 5.3
Bituminous distributor	115.9	115.9	108.3	+ 7.0
Bituminous spreader	160.3	160.3	137.2	+ 16.8
Bituminous paver	149.8	149.8	143.9	+ 4.1

a Index based on January, 1955 = 100
BLS Primary Market Price Indexes, U.S. Department of Labor, 1947-49 = 100

Prices Continue To Rise in April

CONSTRUCTION MACHINERY and equipment makers put higher price tags on several items in April. The price increases ranged as high as 6.7% above the March list, but most of the changes were much smaller.

These increases pushed average list prices of new machinery 0.4% higher in April than March, according to the Bureau of Labor Statistics Price Index. This is the greatest month-to-month rise since last November. It means that at April prices contractors paid 1% more on the average for new rigs than they did last December. Moreover, April prices were a thumping 8.8% more than a year ago.

April price hikes covered a wide variety of machines. Power shovels, for example, moved up from 0.9% to 1.3% depending on size, and truck cranes rose 0.9%.

Prices of shovel attachments showed no change in April, but rollers increased 4.2% to 5.2%, and rippers and rooters moved 4% higher.

Four-wheel scrapers were up 2.3% for larger capacity models and 6.7% for smaller rigs. Heavy-duty graders crept up 0.5%. Crawler tractor prices inched up, but cable power control units went up 2.4%.

More price increases can be expected. At least one major equipment maker has voiced the opinion that prices will go up 4% to 5% this year (Construction Methods forecast a 4% rise for 1957). One reason for further advances: steel prices are sure to rise in the first week of July. The only question seems to be how much.

These jobs profited from Bucyrus-Erie Cranes . . . yours can too!



DENVER, COLO. Tractor-type crawlers provide extra clearance for passing over rocks, boulders, etc. Deep grousers provide sure footing for maneuvering on mountainous terrain. This Bucyrus-Erie 22-B reaches out with a 50-ft. boom and accurately pours its 1-yd. bucket of concrete in the construction of a guided missile plant near Denver.

PASADENA, CALIF. High lifts in erecting a steel bridge are handled by this Bucyrus-Erie team — an 88-B equipped with a 160-ft. boom-jib combination and a 38-B with 110-ft. boom-jib combination. Users recognize Bonus Quality in the balanced performance and daily dependability of Bucyrus-Eries.

COLUMBUS, OHIO. Handling structural steel is one of a variety of light- and heavy-duty lifting jobs assigned to this Bucyrus-Erie 51-B in the construction of a hospital. You'll find all the essentials of profitable crane service in Bucyrus-Eries — speed, power, smooth operation, long reach, stability, and low cost maintenance.

LOUISVILLE, KY. This Bucyrus-Erie 54-B takes full advantage of its stability and 100-ft. boom in placing steel plate during the construction of a pumping station for flood control. The crane is also used here for clamshell service and is also convertible to dragline, dragshovel, or shovel.

DETROIT, MICH. Rugged 24-hr. service on tough tunnel excavation work in storm sewer construction is a natural for this sturdily-built, steady-working Bucyrus-Erie 38-B. It is removing a mud-box filled with muck from the tunnel shaft.



Whatever the job, it can profit from the extra working ability of a Bucyrus-Erie lifting crane. From the ground up, these machines are designed and built to put power and strength to work hoisting and placing loads quickly and smoothly with maximum efficiency.

See your Bucyrus-Erie distributor soon and have him give you all the facts on cranes with lifting capacities ranging from 3 to 60 tons.

334E57

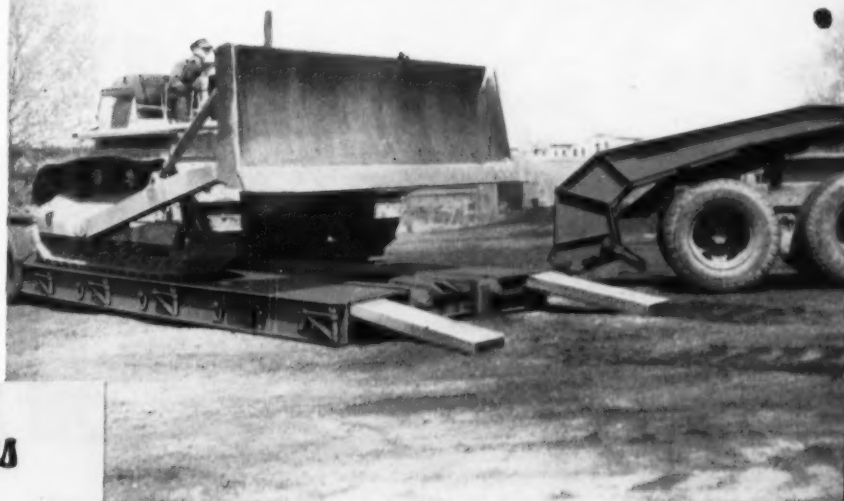
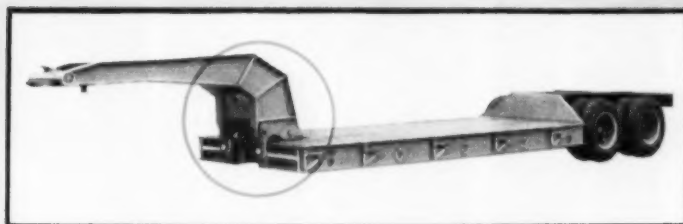
**BUCYRUS
ERIE**

SOUTH MILWAUKEE, WISCONSIN

NEW

Removable gooseneck trailer offers important advantages

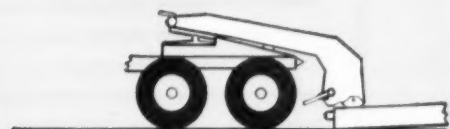
- No cables!
- No winch!
- No hydraulics!
- Gooseneck securely held at all times!



Here's how it works



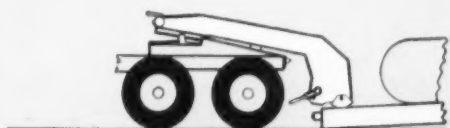
1. Release tractor fifth-wheel lock and lower trailer bed to ground. Raise hinged gooseneck stirrups.



2. Back tractor under gooseneck and lock king pin in tractor fifth-wheel. Release fifth-wheel on trailer bed.



3. Drive tractor with gooseneck forward... unload machine over front end of trailer.



4. After re-loading, back tractor and gooseneck into position until king pin locks in trailer fifth-wheel. Release tractor fifth-wheel lock and drive tractor forward to lower gooseneck and lower stirrups.



5. Back tractor under gooseneck to raise loaded trailer.

FRONT END of trailer
lowers directly to ground

• SAVES 2 to 3 hours
on every job move

• SIMPLIFIES loading and
unloading in congested areas

Here is a heavy-duty removable gooseneck trailer, developed by LaCrosse, that enables *one man* to load or unload big equipment anywhere in a few minutes. *Time-tested fifth-wheel — king pin connection* between gooseneck and trailer simplifies alignment... eliminates need for complicated sheave and cable arrangements... and assures complete control of gooseneck at all times, whether hooked or unhooked from trailer. New LaCrosse R G trailers are available in 25 to 50-ton capacities, with tandem walking beam or spring-mounted running gear... and up to 75-ton capacity with new LaCrosse triple-axle design. Choice of flat, drop-side, or beam deck. Write for free literature today. LaCrosse Trailer Corp., LaCrosse, Wis.

LC-44

Heavy
metal
fabrication
since
1865

LaCROSSE

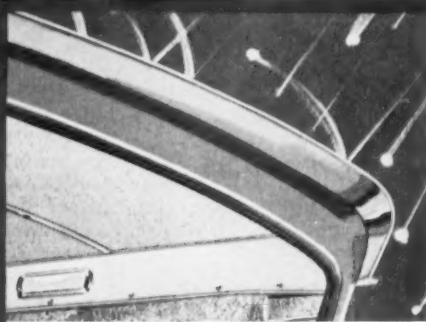
AMERICA'S FAVORITE LOW BED TRAILER

NEW REO

...with

*in standard steel, or
lightweight aluminum and
magnesium models specially
designed for west coast.*

**NEW HEAVY-DUTY CUMMINS
FROM 175 TO 335 H.P.**



New slant-back windshield plus overhang provides double-protection from falling debris, snow and ice.



New panoramic vision for driver gives him full sweep ahead and on both sides without glare, distortion or obstruction.

DIESELS

revolutionary Reo Driver's Cab

Reo's New B Series Diesels are brand new. They are the result of extensive research and testing to find the perfect cab for *all drivers . . . in all operations . . . and under all conditions*. They introduce a new concept in driver comfort, convenience and safety—from the Bostrom "Level Ride" seating to the "Panoramic Vision" slopeback windshield . . . from the flat floor and living room spaciousness to the visibility of instruments and convenience of controls.

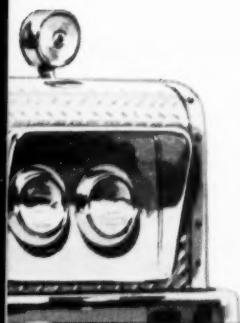
Both four and six wheel tractors and trucks come in all steel or weight reduced aluminum and magnesium. These trucks are especially engineered for economical "Big Load" operations—long-distance highway hauling or tough off-highway service.

Over 8,000 combinations are possible in custom engineering a model to your specific operating requirements...using only proven major components from a wide selection.

"Heavy" trend is to Reo! Reo sales gain in 26,000 lb. and over GVW class exceeds that of the industry during last 2 years.



REO MOTORS, INC., LANSING 20, MICHIGAN • TORONTO, ONTARIO



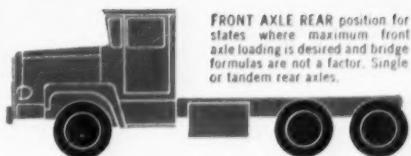
New "living room" comfort for driver. Full leg room. No "dog house". Bostrom "Level Ride 80" driver's seat.



New roominess under hood for ease in servicing engine. Husky "Catwalk" fenders, with "diamond" safety treads.



FRONT AXLE FORWARD position for states where total combination weights are controlled by bridge formulas. Single or tandem rear axles.



FRONT AXLE REAR position for states where maximum front axle loading is desired and bridge formulas are not a factor. Single or tandem rear axles.

**"THIS IS THE
MACHINE
WE'VE BEEN
LOOKING FOR!"**



**The D9 is not only a great bulldozer but in good material
it loads a DW21-Scraper unit in 25 to 30 seconds
for Copper State Construction Co.**

The CAT* D9 Tractor shown here is building a clover leaf on U. S. 70, some 20 miles east of Globe, Arizona. Copper State Construction Co., of Mesa, Ariz., has the 70,000-yard contract. On hauls of 1200 to 2200 feet each way, three rubber-tired rigs are handling about 4500 cubic yards per day, with cycle times of about 4½ minutes. In tough, unripped material tandem pushers are used, loading a DW21 and Scraper in about 30 seconds. Where material is better, the D9 alone does the loading job in 25 to 30 seconds.

Superintendent Roy Hale says: "This D9 is the machine we've been looking for. We like the torque converter. It gives smooth operation and will lengthen the life of the tractor."

Much of the new D9's high work output is due to its Cat Diesel Engine—the first Turbocharged engine on any track-type tractor. It now develops 320 HP at the flywheel. The D9 is available with torque converter or

exclusive oil clutch, to suit your needs. And it offers in-seat starting, hydraulically boosted controls, smooth, constant power drive for cable controls and excellent operator visibility. It's as easy to handle as many smaller tractors.

See your Caterpillar Dealer and let him *prove* that this "King of the Crawlers" can do more work at lower cost on *your* job.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR*

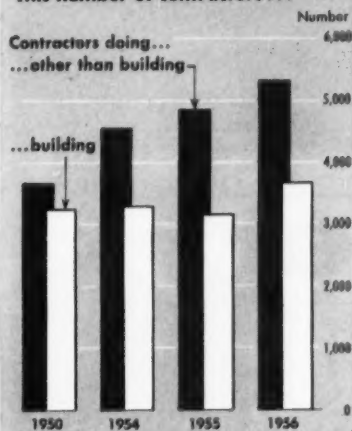
*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

**NAME THE DATE...
YOUR DEALER
WILL DEMONSTRATE**

Construction Business...

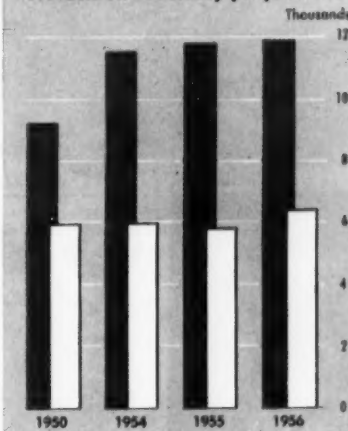
Booming New Business in '56 Brings Big Rise in Heavy Construction Contractors*

This number of contractors...

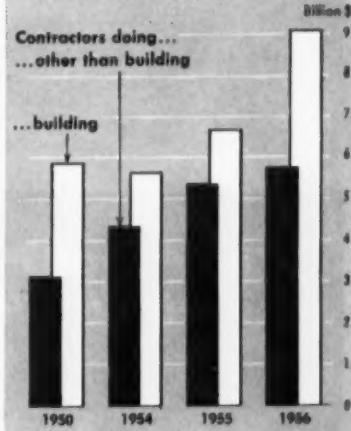


*Contractors with \$100,000 or more in annual heavy construction contracts reported by Construction Methods

...took on this many projects...



...for this much dollar volume



Contractors Get 23% More New Business in 1956

HEAVY construction contractors signed up a record \$14,743 million in new contracts during 1956. This towering volume of work was shared by 8,941 contractors, each with \$100,000 or more in new contracts for the year as reported to Construction Methods. Never before have so many contractors racked up so much business in one year. In fact, there were 12% more firms in this bracket in 1956 than in 1955.

Of these contractors, 5,279

were active on heavy construction other than building. This is 9% more than in 1955. Contractors on highways are the largest group, which is still growing. They increased 8% last year to top 2,500 for the first time. Their new business also rose 8% in dollar value last year though the number of projects increased only 3%.

Second largest number of heavy construction contractors was the 946 doing sewerage construction,

7% more than in 1955.

But the largest increases in the number of firms winning contracts for heavy construction other than building came in the bridge and earthwork and waterway fields. Contractors active on these types of work increased 16 to 17%.

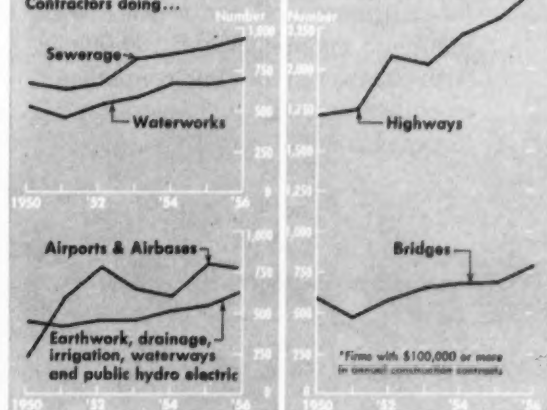
Building Firms Up 16%

More spectacular 1956 gains in new business and in the number of contractors doing \$100,000 or more came in the building field. A 70% jump in industrial building business brought a 25% increase in the number of building contractors taking on this type of work. Other building contract

continued on page 56

How Contractors* Increase as new business grows

Contractors doing...



*Firms with \$100,000 or more in annual construction contracts

HOW CONTRACTORS DIVIDED 1956 BUSINESS

Type of Work	Number of Contractors		Projects		Contract Value (millions)	
	1956	% Chg. fr '55	1956	% Chg. fr '55	1956	% Chg. fr '55
TOTAL	8,941	+12	19,180	+4	\$14,743	+23
Total - Other than Building	5,279	+9	11,796	+1	5,701	+9
Waterworks	711	+5	1,056	0	323	+9
Sewerage	946	+7	1,279	-5	513	+33
Bridges	799	+17	1,122	+9	523	+3
Streets and roads	2,510	+8	5,834	+3	2,148	+8
Earthwork & waterways	637	+16	927	+22	942	+33
Airports	779	-4	992	-18	632	-5
Unclassified	821	+6	886	-6	620	-15
Federal (incl. above)	1,327	+5	1,734	-6	1,153	+7
Total - Building	3,662	+16	6,384	+16	9,042	+36
Industrial	1,409	+25	2,133	+26	4,210	+70
Mass housing, commercial, public	2,254	+16	4,256	+4	4,832	+16
Federal (incl. above)	236	+25	279	+26	341	-9

0 less than 0.5%

up and



over



**The Payoff Power
is Chrysler**



Huge, collapsible rubber containers for economically storing and shipping flowable bulk are *filled, transported, loaded* with speed and ease by one man and a 12-ton Silent Hoist *Lift-O-Krane*. This unique fork truck-crane combination is powered by Chrysler for maximum-load performance with minimum maintenance . . . equipped with Chrysler gýrol Fluid coupling for smoother starting and acceleration. longer engine life.

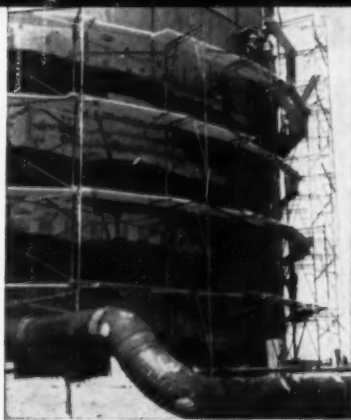
CHRYSLER INDUSTRIAL 33, in-line 6 Engine (265 cu. in. displacement) powers the Silent Hoist Lift-O-Krane—and many other makes of equipment in the construction and materials handling fields. There are five Chrysler in-line 6s, two V-8s—ranging from 230 to 354 cu. inch displacement. For detailed information about Chrysler Industrial Power, write: Dept. F-6, Industrial Engine Division, Chrysler Corporation, Detroit 31, Michigan.

Chrysler
INDUSTRIAL ENGINES

INDUSTRIAL ENGINE DIVISION • CHRYSLER CORPORATION



TO BUILDING CONTRACTORS, steel scaffolding has long been a familiar time and money saver. Here, "TubeLox"® Scaffolding is used to provide platforms for masons and to support a monorail materials-handling system. Construction is a new addition to the Prudential Insurance Co. Bldg., Los Angeles, Wm. Simpson Co., gen. contr.



SPECIALIZED CONSTRUCTION techniques are required during erection of unusual and varied structures at Tidewater Oil Co.'s Flying A Refinery, Wilmington. To help ease the job, C. F. Braun & Co., contractor, uses 15 miles of "TubeLox"® Scaffolding and 3500 "Trouble Saver" Sectional Scaffolding frames.



PIER COLUMNS for one of five overpasses on a section of New York Thruway get an assist from "Trouble Saver" Sectional Scaffolding. It supports vibrating machines and workers, and helps in the erection of formwork for above-ground sections of pier shells. Carlo Bianco is the contractor on this portion of the job.

Alert contractors show how to . . .

Cut Costs with Steel Scaffolding

ON ANY TYPE OF CONSTRUCTION—buildings, bridges, dams, roads, refineries and many others—contractors everywhere are realizing that modern steel scaffolding helps to move men and materials with greater speed and safety at lower cost. Because of its versatility of application, ease of handling, quick erection and dismantling, it can more definitely establish, often speed-up, completion dates.

Shown here are some of the typical jobs accomplished with the help of steel scaffolding. Mentioned also are only a few of the many types of scaffolding available. If you have a specific construction job coming up, you can get more detailed information

simply by asking for it—no obligation, of course.

To help you with your scaffolding and concrete shoring methods, PS offers a complete nation-wide engineering service available to you locally. See the Yellow Pages in your 'phone directory for the nearest Patent Scaffolding office or representative that sells and rents "Gold Medal" Scaffolds.

FOR GREATER SAFETY...EFFICIENCY...ECONOMY



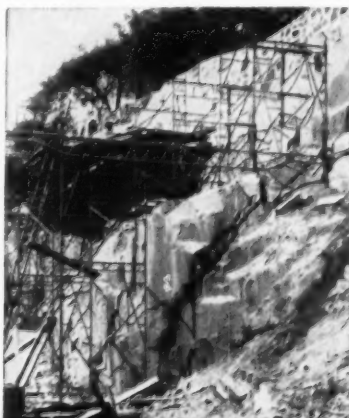
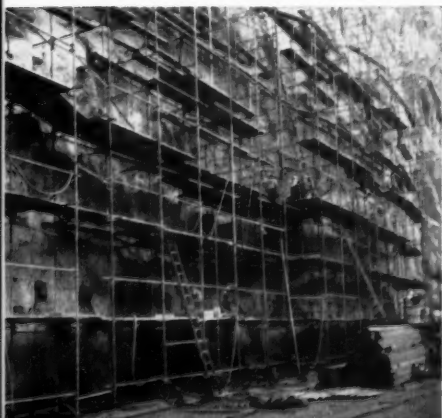
THE PATENT SCAFFOLDING CO., Inc.

38-21 12th Street Dept. CM&E, Long Island City 1, N. Y.
West Coast: 6931 Stanford Ave., Los Angeles 1, Calif.
In Canada: 355 Dufferin St., Toronto
Branches in all principal cities

349 ROCK ANCHORS are installed by Selby Drilling Co., contractor, to secure huge slab above Nevada valve house at Hoover Dam. 11,000 lineal feet of "TubeLox" Steel Scaffolding, with posts on 7'6" centers, provides working platforms and is cantilevered inward to conform to rock face.

SECURITY WALL above rock face along Helix Roadway Approach to New York City's Lincoln Tunnel requires this "Trouble Saver" Sectional Scaffold. Grow Construction Co. uses prefabricated "Trouble Saver" Scaffolding frames and braces, and 22' long trusses, to form wide level platforms for workmen.

OVERPASS is shored by 272 "Trouble Saver" Steel Shoring 5'-wide frames on street location job at Scotch Plains, N. J. Mal-Bros. Constructions Co., contractor, erects 3' x 5' towers spaced 1' apart and in rows 2'6" apart to provide ample support for pouring new concrete roadbed, cutting costs 25%.



business rose 16%—mainly due to commercial and public construction which increased while housing fell. The number of contractors active in this field also rose by 16%.

Growth Means Competition

The number of contractors doing \$100,000 or more of heavy construction other than building rose faster in 1956—up 9%—than the number of projects available—up 1%—or the dollar value of work awarded—up 8%. This

means that competition increased faster than new work. Intensifying this competitive situation is the growth of the individual contractor's capacity for handling new work.

This year is bringing another big rise in new business. Contracts (excluding building) are running 18% above the 1956 rate, about double the 1955-56 rate of increase. But the past history of the construction industry shows that the more business there is, the greater will be the number of contractors actively competing for the work available. Competition is likely to remain stiff.

So far this year...

Private Building Slumps, But Other Types Boom

Nearly every major type of heavy construction is booming this year—except private building and sewerage work. Because of slumps in private industrial building and mass housing and a slow start in commercial building, total heavy construction contracts trailed 1956 by 19% at the end of May. However, the \$7.9 billion in total awards to date is second highest on record.

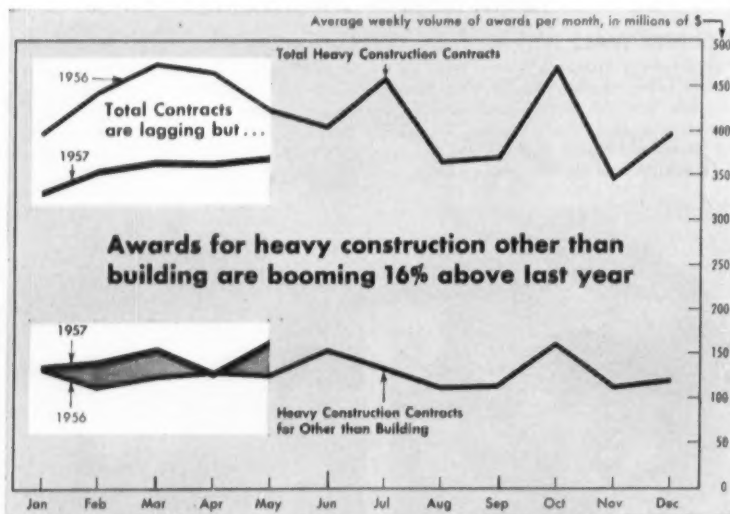
Though building contractors are finding much less new work available this year than last, contractors doing other than building have a "land office" business.

They racked up a record \$3.2 billion in contracts during the first five months, 16% more than a year ago.

So far this year, highway contracts are up 23% over 1956, and bridge awards are 19% ahead of last year. Earthwork, irrigation, drainage, waterways, and (public) hydro power work show a tremendous 85% jump. And waterworks volume has shot up 43%.

While sewerage contracts are 31% below 1956, all of the difference is due to one huge project included in last year's figures.

continued on page 62



For more details about the...

NEW GUARANTEED AVAILABILITY PLAN

see a participating Blue Brute distributor

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Ben Williams Equipment Company—Andalusia
H. S. Salmon & Company—Birmingham

CALIFORNIA

West Coast Engine & Equipment Co.—Berkeley
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H. P. Kingsley Company—San Bernardino
Vern & Flynn's Rental Service—San Carlos
Kenton Equipment Company—San Diego

COLORADO

Power Equipment Company—Denver

CONNECTICUT

Construction Equipment Company—Wilson

FLORIDA

Julien P. Benjamin Equipment Co.—Jacksonville
A. W. Thomas Construction Machinery—N. Miami
Highway Equipment & Supply Co.—Orlando

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Riverside Sales Contractors Equip.—Brookfield
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Minneapolis Equipment Company—Minneapolis

MONTANA

Caird Engineering Works—Helena

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Miller Equipment Company—Dunellen
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Gaines W. Harrison & Sons—Columbia

SOUTH DAKOTA

Sioux Road, Inc.—Rapid City, Sioux Falls

TENNESSEE

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VIRGINIA

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Precision Machine & Foundry—Calgary, Alberta
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Montreal, Quebec

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Blue Brute distributor.



An
air tool
on
free loan
if your
Blue Brute
needs
repair!

BLUE BRUTE DISTRIBUTORS ANNOUNCE NEW GUARANTEED AVAILABILITY PLAN

The most important thing about an air tool is to keep it out on the job working.

That's why Worthington Blue Brute tools are built for ruggedness—for ability to stand up under day-in, day-out punishment.

Another progressive step in keeping Blue Brute air tools on the job has just been announced. Under the terms of a new Availability Plan, we will lend you an air tool free if any of your hand-held Blue Brute tools is in our shop for repair.

Greater tool stocks, parts inventories

To be sure the tool you need is there when you need it, we have recently enlarged our stock of standard air tools and accessories. We also carry a large inventory of parts so that repairs or replacements can be made quickly and inexpensively.

For greater profits keep your air tools on the job by (1) buying Blue Brute tools and (2) taking advantage of the Guaranteed Availability Plan. For complete details on the new plan, ask your nearby Blue Brute distributor for Bulletin G-2500.

B74A

WORTHINGTON



Costs of city work seem too high?

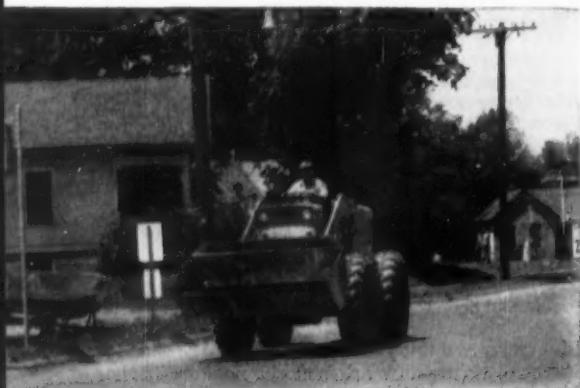
LOOK HOW SANGAMO CONSTRUCTION CO. CUTS THEM

This well-known 30-year-old Springfield (Illinois) firm, a year ago, had a problem common to most city-area contractors. Moving costs and traffic slow-downs were taking much of the profit out of their municipal work. Small, extra, one-day or weekend jobs, which *could* have built income, often couldn't be handled because, like many contractors, their equipment was either too small or too big. Sangamo, however, found a solution. They bought Michigan Tractor Shovels. Today, their \$3,000,000 annual volume is *largely* in city work and *three* of their busiest, most profitable machines are Michigans.



Does job of bigger machines setting 12 inch sewer pipe

Often, one of the Michigans is assigned to a major job where maneuverability is a vital factor in speeding completion. Above picture shows typical task of this type—laying eight miles of 8, 10, and 12-inch sewer pipe for the city of Decatur (Illinois). Daily—almost hourly—this Model 75A shuttled between *three* crews. Tasks included pushing spoil away from trencher . . . back-filling . . . transporting and laying pipe. At times, it set manholes weighing 1200 to 1500 lbs per ring section. Biggest advantages proved to be speed (a typical half-mile trip took 75 seconds) . . . rugged construction (in a summer of work, no time was lost from the job for repairs) . . . planetary axles (which eliminated all axle breakage despite rugged lifting demands)



Drive, turn non-stop on narrowest city streets

All these units can be on their way to any kind of loader job in minutes. "These rigs go anywhere," says Clyde Turner, one of Sangamo's job superintendents. "They can run three or four blocks, through auto and truck traffic, in a minute or so. Twenty-seven miles takes only an hour. Rubber tires don't tear up asphalt or oil-mat pavement. They can even go up on a sidewalk without breaking it or the curbing. And our Model 75A's (which are 6' 8" wide and 16' 10" long) can turn around non-stop on the narrowest city streets."

(Advertisement)



Carries 1800 lb water main section

Bigger loads have been no problem for the Michigans, either. Above, the second of Sangamo's 80 hp Model 75A's carries an 1,800 lb, 18 ft section of 20 inch water main. This unit *can* lift 8,000 lbs while standing still . . . can carry 4,000 lbs at 4 mph.



Clears, loads 1,000 yards of rubble in 1½ days

Sangamo's third Michigan Tractor Shovel, a 95 hp, 2 yard Model 125A, also handles assignments where speed is important. Here it's on a historical job in Springfield—clearing the wreckage of Illinois' first governor's mansion to make way for a parking lot. Entire 1,000 cubic yards of rubble and dirt was piled and loaded out in 1½ days. Sangamo Construction bought this machine, their first Michigan Tractor Shovel, after having it demonstrated (to quote Company President, Bill Kewley) "on the toughest tractor shovel work we could find—digging up wet rocky ground to improve drainage around a Springfield sewage treatment plant. Later," Kewley continues, "it proved so handy and so dependable, all our crews wanted one. So, in 5 months, we bought our second Michigan, and 3 months later, our third."



Full buckets are the trademark of all Sangamo's Michigans. Here the Model 125A, bin-storing hot mix material, carries *more* than its rated 2 yard capacity. Unexcelled breakout force, low-level tipback, and low-level-carry result in the delivery of big loads every time, the operator says.

Stockpiling gravel is another job for the busy Model 125A. While at this city-located yard, rig sometimes loads trucks and railroad cars, feeds the crusher, does cleanup. Its standard 2 yard bucket, incidentally, is interchangeable with either 1¾ or 2½ yard buckets.

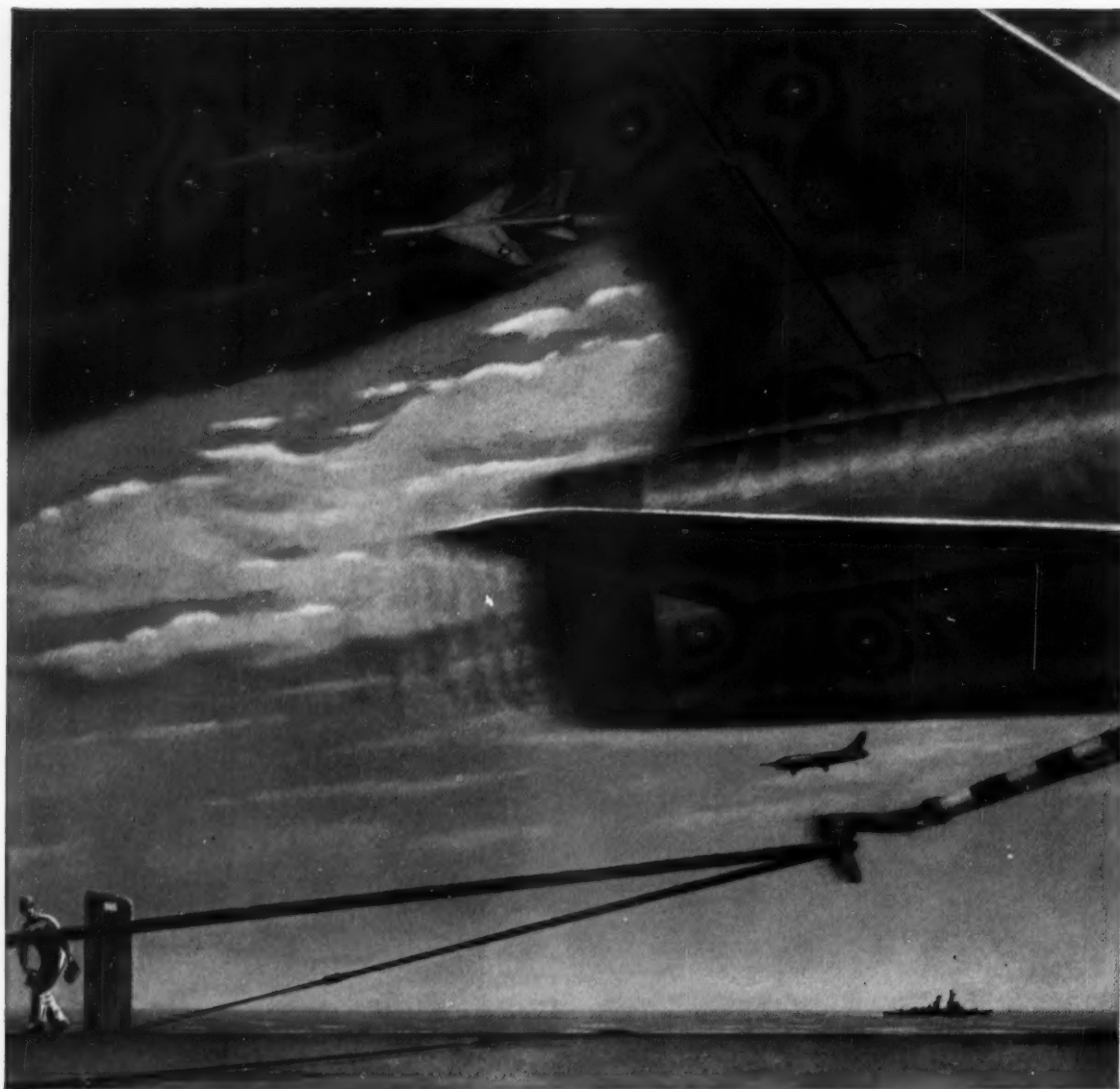


The model 75A's standard 1¼ yard bucket interchanges with ¾ and 2 yard sizes. Both models can also be equipped with crane hooks, fork lifts, backfiller blades, scarifiers and root rakes. For small jobs you can get a Michigan Model 12B with 6, 10, 16, 20, or 27 cubic *foot* capacity . . . for big jobs you can get a Michigan Model 175A with 1¾, 2¼, 2¾ (standard), 3¼ or 5 cubic *yard* capacity. For help in determining which of these four models, or which of their 35 different buckets and attachments, *best fits your needs*, ask one of our job study engineers to study your layout. Feel free to call or write us any time for this service. It's free, of course and realistic . . . and will put you under no obligation whatsoever.

Michigan is a registered trade-mark of

**CLARK®
EQUIPMENT**

CLARK EQUIPMENT COMPANY
Construction Machinery Division
2403 Pipestone Road
Benton Harbor 27, Michigan
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In carrier landings, planes coming in at more than 100 knots are stopped in a split second. This amazing performance is made possible by having each plane hook onto one of several wire ropes stretched across the flight deck. Both plane and rope receive an almost unbelievable shock at the moment of contact. Needless to say, only top-quality wire ropes can be used for this application because...

you can't bargain with safety

While your use of wire rope differs from this carrier application, *safety should be just as important to you*. For, although a "bargain" rope may save you money, it can cost you your peace of mind. So don't bargain with safety. Buy a rope that's a *quality* rope—buy Wickwire Rope.

5049



**LOOK FOR THE
YELLOW TRIANGLE**

**PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL AND IRON CORPORATION**

THE COLORADO FUEL AND IRON CORPORATION—Denver • Houston • Odessa (Tex.) • Phoenix • Salt Lake City • Tulsa
PACIFIC COAST DIVISION—Los Angeles • Oakland • Portland • San Francisco • Seattle • Spokane
WICKWIRE SPENCER STEEL DIVISION—Boston • Buffalo • Chattanooga • Chicago • Detroit • Emlenton (Pa.) • New Orleans
New York • Philadelphia



With 70' boom, 15' jib, Michigan Crane lifts 1,500 lbs of steel columns to third floor of new Wheaton college infirmary.

Tight quarters, scattered assignments no problem for Illinois firm *after this crane goes to work*

Like many other contractors, Olson Brothers, Aurora, Illinois, had always used crawler-mounted cranes for concrete-pouring, steel-setting and other hoisting work. Trouble was, none of their crawler machines could move rapidly—even when only short distances were involved. Nor could they maneuver readily in the tight quarters so often found around new buildings. So, the Olsons decided to switch to a truck crane. They chose the 15 ton capacity, 41,000 lb Model T-20 Michigan shown here.

No need to strip this Michigan for travel

"We can road this Michigan from job to job without taking off its standard 30 ft boom or counterweights," explains Ralph Olson. "Its all-wheel drive gives us the tractive ability to go through mud . . . its maneuverability and 8'0" width lets us get into extremely confined areas."

Lifts 6 ton beam 70 ft

Above, Olson Brothers' Michigan does a typical tight-quarter lifting job. Boom is 70 ft long, jib 15 ft, material being handled is steel beams. Biggest load lifted was a 50 ft I-beam weighing six tons.

Pours 20 yds of concrete in 1 hour

On another frequent assignment—pouring concrete—the Michigan ordinarily hoists a $\frac{1}{2}$ yard bucket on 60 to 70 ft of boom. Pours usually vary from 75 to 130 cubic yards per day—all finishers can normally handle. Top pour has been 185 cubic yards in 9½ hours. Complete turns on this job were made in as little as 50 seconds.

Hoists 15 ton press

The Michigan handles a great many one to five hour contract jobs, too. It has lifted such items as a 15 ton press . . . a 7 ton cabin cruiser . . . a 40 ft industrial chimney. Recently, with 80 ft of boom, it installed a 2,000 lb, 21 ft high church steeple on top of a 50 ft building. "My hooker, Joe Waloszyk, and I," says Operator Joe Parlow, "can take 30 to 40 ft of extra boom and 15 ft of jib off the top of our pickup truck where we carry it from job to job, lay out, pin and string in an hour or hour and a half."

Easy operation reduces fatigue

"I sure like Michigan's easy operation," continues Parlow, a veteran of 10 years

on cranes. "You don't get tired at all. Being able to drive the truck through remote control from the crane cab makes my job easier too. And maintenance is practically nil. Roller bearings have to be greased only once every thousand hours; not once a week like many cranes. All those sealed bearings and shafts let me do a complete servicing job in less than half an hour!"

If servicing—or downtime—or lack of mobility are cutting your profits, we suggest you look into a fast, dependable, job-proved Michigan Truck Crane. Two sizes now available . . . the new 15-ton Model T-20, described above, and the new 25-ton Model T-24. Call us for all the facts.

Michigan is a registered trade-mark of
CLARK EQUIPMENT COMPANY
Construction Machinery Division
2403 Pipestone Road
Benton Harbor 48, Michigan
In Canada: Canadian Clark, Ltd.
St. Thomas, Ontario

CLARK®
EQUIPMENT

Public building awards are also on the rise, offsetting some of the drop in private building. Contracts for public nonresidential buildings were 10% higher than last year at the end of May. Credit for most of this increase goes to school construction which is having its biggest building year in history.

For the first four months, school contracts were 18% above last year with all regions except New

England topping the year ago volume (later figures have not yet been compiled from Construction Methods' contract award reports).

Public housing awards chalked up an 81% increase over 1956 during the first five months of this year. Resumption of the "Capehart" military rental housing program (after a temporary freeze earlier this year) is responsible for this rise.

SOME BIG CONTRACT AWARDS OF THE MONTH

Morrison-Knudsen Co., Inc., 319 Broadway Ave., Boise, Idaho and Utah Construction Co., 100 Bush St., San Francisco, Calif. Construct 300x70x130-ft rein.-con. Table Rock Dam power house and power switchyard, near Branson, Inv. 03-050-57-13, Missouri, U.S. Engineers, 300 Broadway, Little Rock, Ark. \$6,191,206.

Wark Co., 1920 Sansom St., Phila., Pa. Air reserve flying center, NBY 8886, Willow Grove, Pa. Dpt. Navy, Phila. Naval Base, Phila., Pa. \$5,798,900.

Malan Construction Corp., 2 Park Ave., New York 16, N.Y. Facilities for testing performance of jet-propelled aircraft at Naval Air Station, Lakehurst, N.J. Department Navy, Phila. Naval Base, Phila., Pa. \$5,133,000.

Fluor Corp., Ltd., 2500 S. Atlantic Blvd., Los Angeles 22, Calif. Design and construct 16,000 bbl per day low end point catalytic reforming unit and desulfurization facilities, Sweeney, Tex. \$4,000,000.

McDonald Bros., 2639 So. LaCienega Blvd., Los Angeles, Calif. Concrete block masonry steel manufacturing building and administration building, Nimbus, Calif. Aerojet General Corp., 410 Citrus Ave., Covina, Calif. \$3,378,360.

M. J. Kuney, N. 120 Ralph St., Spokane, Wash. Treatment plant with screen and chlorine bldg., grit chamber bldg., sludge control bldg. and sludge pumping bldg., Spokane, Wash. City Hall, Spokane, Wash. \$1,830,750.

Hoke Construction Co., Stillwater, Okla. Family rental apartments, Stillwater, Okla. Oklahoma Agricultural & Mechanical College, Stillwater, Okla. \$1,773,702.

Madonna Construction Co., P.O. Box 910, San Luis Obispo, Calif. Construct 5.9-mi freeway, together with frontage roads, ramps, rein.-con. bridge and rein. box culvert on U.S. 101 between Wigmore and 1.7 mi north of Los Alamos, Santa Barbara County. State Department of Public Works, 1120 N. St., Sacramento, Calif. \$1,473,000.

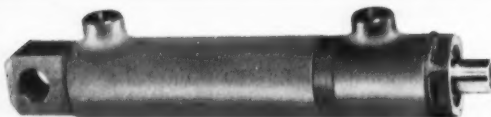
Construction Equipment Works Better Longer With . . .

B. H. E. W. Custom-Built HYDRAULIC CYLINDERS

1. Honed steel cylinder.
2. Full double-sealing "U" cup packing.

Compactness! Efficiency! Close Tolerances! Outstanding operational performance! You get them all in BHEW cylinders. They require minimum mounting space. There is no tooling charge for BHEW cylinders, built to meet your specifications and delivered on schedule.

BHEW cylinders are available in standard and special O.E.M. designs . . . single or double acting and telescopic; 1½" to 8" bore; strokes up to 156"; oil hydraulic service in 1,500 psi or 3,000 psi working pressure, pneumatic up to 150 psi; cup-type, ring-type or O-ring construction; choice of mounting.



Furnished in a wide variety of mountings and anchor brackets.

Send us specifications of your requirements, for full information.

Do you have problems involving cylinders? Our extensive engineering service is available to you without charge.



Benton Harbor Engineering Works, Inc.

622 Langley Avenue

St. Joseph, Michigan



Here's how Sinclair helps you... MEET OR BEAT SCHEDULES

The Sinclair Contractor Lubrication Services Program is designed to help contractors keep equipment on the job—operating continuously by keeping downtime to an absolute minimum. You get complete lubrication protection with a *minimum* number of lubricants. You get help in training of lubrication and equipment maintenance personnel. You get help in solving lubrication and allied maintenance problems. You reduce your lubrication and maintenance costs.

Other advantages of Sinclair's 10-Point General Industrial Lubrication Services Program include . . .

Sample Analysis: Sinclair will analyze samples of new and used petroleum products where requested or required. Full laboratory reports, including test results, their interpretation, and recommendations will be supplied.

Prompt Product Delivery: Sinclair's efficient and conveniently-located bulk stations make for quick delivery of petroleum products to construction points.

A trained Sinclair Lubrication Engineer—in fact, the entire Sinclair Technical Staff—is ready to help you meet or beat schedules. Call your nearest Sinclair Representative or write: Sinclair Refining Company, Technical Service Division, 600 Fifth Avenue, New York 20, N. Y. There's *no obligation!*

SEND FOR THESE LUBE GUIDES NOW . . .

SINCLAIR

**INDUSTRIAL LUBRICATION
SERVICES PROGRAM**

SINCLAIR REFINING COMPANY
Technical Service Division, 600 Fifth Avenue, New York 20, N. Y.

FREE! Please send me, at no obligation, the Lubrication Guides I have checked.

- Road Building and Construction Machinery ☐
- Materials Handling Equipment ☐
- Trucks, Buses & Motor Coaches ☐
- Internal Combustion Engines ☐

Name _____

Company _____

Street _____

City _____ Zone _____ State _____



because of the **HANCOCK'S ELEVATOR**

**No other Scraper
can move so much
dirt, so fast!**

Because the Hancock Scraper elevates material instead of force loading it, you get high speed loading and move more dirt with less horsepower.



The Hancock Elevating Scraper has the features to give you lowest-cost-per-yard of earth moved. With the elevator continually removing the dirt from around the cutting blade and distributing it evenly throughout the scraper, you get a balanced load at all times. The Hancock 11 Yard Elevating Scraper is hydraulically controlled, works efficiently with any tractor of 60 horsepower or over, and turns in only 28 feet.

HANCOCK MANUFACTURING CO

PO3-8297 Lubbock, Texas

Patents Pending



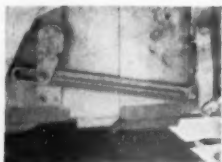
These HANCOCK features mean lowest cost per yard of earth moved.



FIFTH WHEEL — Extreme flexibility and simple adjustment result from ball joint type fifth-wheel.



WHEELS — Scraper has heavy-duty wheels, standard industrial tires and standard wheel bearings.



SPREADING UNIT—Delayed dumping of the front bucket permits controlled release and spreading of dirt.



GEARBOX and ELEVATOR — Heavy duty elevator frame is combined with a strong, rugged, trouble-free gear box.



REAR AXLE — Simple but rugged rear axle construction provides for easy alignment to assure level cut.



The new Farmers Union Central Exchange Office Building at South St. Paul, Minnesota. LEHIGH MORTAR CEMENT was used with brick, concrete block, glazed tile, tile and granite.

contractor reports ECONOMY, SPEED, QUALITY WITH LEHIGH CEMENTS

"As you know," writes Mr. Frank Cahill of Graus Construction Company, "we are subject to long and very cold winters. Therefore, we chose to use Lehigh Early Strength Cement on this job. It proved to be an excellent choice as we were able to eliminate costly overtime in finishing, reduce curing time and put finished concrete into early use.

"For all masonry, we used Lehigh Mortar Cement. As masonry foreman Mike Christenson says, 'Lehigh Mortar Cement performs well in any weather and excels in workability and high bond strength.'"

Whatever your cement requirements, there are Lehigh Cements to help you produce quality work with speed and economy.

- LEHIGH EARLY STRENGTH CEMENT
- LEHIGH MORTAR CEMENT

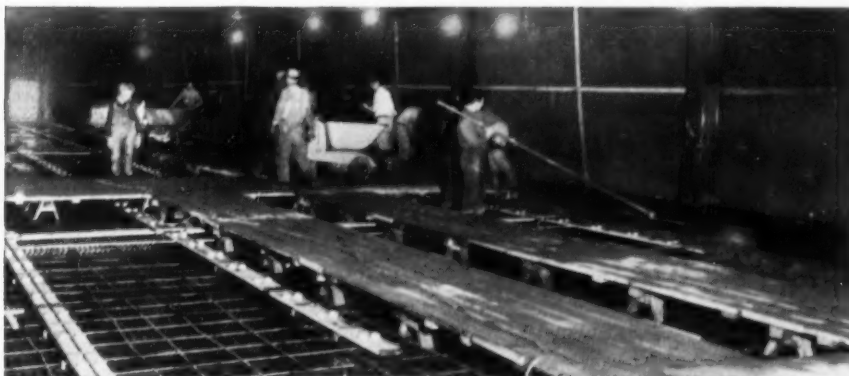
- LEHIGH PORTLAND CEMENT
- LEHIGH AIR-ENTRAINING CEMENT



LEHIGH PORTLAND CEMENT CO. Allentown, Pa.

ARCHITECT:
Ellerbe & Company, St. Paul, Minnesota
CONTRACTOR:
Graus Construction Co., Hastings, Minn.

SUPPLIER OF MORTAR AND
READY MIX CONCRETE
Standard Building Material Co.,
South St. Paul, Minn.

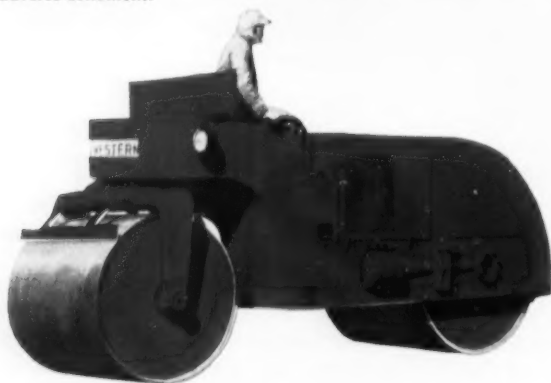


Placing concrete floor made with LEHIGH EARLY STRENGTH CEMENT. Quick-curing concrete permitted early use of this floor for storage of construction materials.



THE A-W 3-WHEEL ROLLER

Available in 8-11, 10-12, 12-14 ton models. The left drive roll is keyed to the axle shaft; the right turns on heavy duty bushings independently of the left roll and axle. Power is automatically transferred from the slipping roll to the opposite roll by a torque-proportioning-type differential which assures traction even under the most adverse conditions.



THE A-W TANDEM ROLLER

Available in 5-8, 8-12 10-14 ton models. All models have full-width seat and dual controls. Forward and reverse levers are located at each side of platform, with steering lever at center permitting operator to sit where visibility is best.



THE A-W PORTABLE TANDEM ROLLER

3½ to 6 ton, showing optional towing equipment. Full hydraulic steering. Powered with 4-cylinder gas engine.

AUSTIN-WESTERN ROAD ROLLERS

offer you
smooth power,
balanced weight,
finger-tip control

Faster, more efficient compaction and finishing are yours with the new line of A-W Road Rollers. From power unit to final drive, all are engineered to give the operator complete confidence in his machine. Regardless of the work—subgrade, crushed stone, soil cement or black-top—these rollers will do a top-flight job.

All A-W 3-wheel and tandem rollers are powered by your choice of gasoline or diesel engines with 4-speed (regular) or 2-speed (optional) transmissions. Torque converter drives are optional. Drum-type front and rear rolls permit ballast variations in weight up to 4 tons.

Some of the A-W extras that give you better roller performance:

- Oversize axles and antifriction bearings for longer life
- Transmission gears are machine cut heat treated
- Transmission is equipped with antifriction bearings
- 3-wheel rollers have heat-treated alloy steel bull pinions and high-strength steel bull gears
- Tandem rollers have machine-cut, heat-treated final drive bevel gears and pinions
- Outside edges of finished rolls are beveled to prevent marks in hot materials

An important advantage to owners of both A-W 3-wheel and tandem rollers is the fact that 75% of all driving and steering mechanisms are interchangeable. Get all the facts from your nearby Austin-Western distributor or write to us for them.

Power Graders • Motor Sweepers • Road Rollers • Hydraulic Cranes



AUSTIN-WESTERN WORKS

BALDWIN-LIMA-HAMILTON

Construction Equipment Division

OTHER DIVISIONS: Eddystone • Lima •
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Loewy-Hydropress • Standard Steel Works
• Madsen • Pelton

AURORA, ILLINOIS, U.S.A.



Why use automobile grease in heavy-duty equipment?

Let's not kid ourselves about the difference between the lubrication requirements of automobiles and heavy-duty machinery. D-A Lubricants are compounded specifically for heavy-duty equipment. There is a right one for every application.

For example, D-A Track Roller Lubricant • D-A Type AC Track Roller Lubricant • D-A Winter Track Roller Lubricant • D-A Open Gear • D-A Torque Fluid • D-A Lithium, Extra-Heavy.

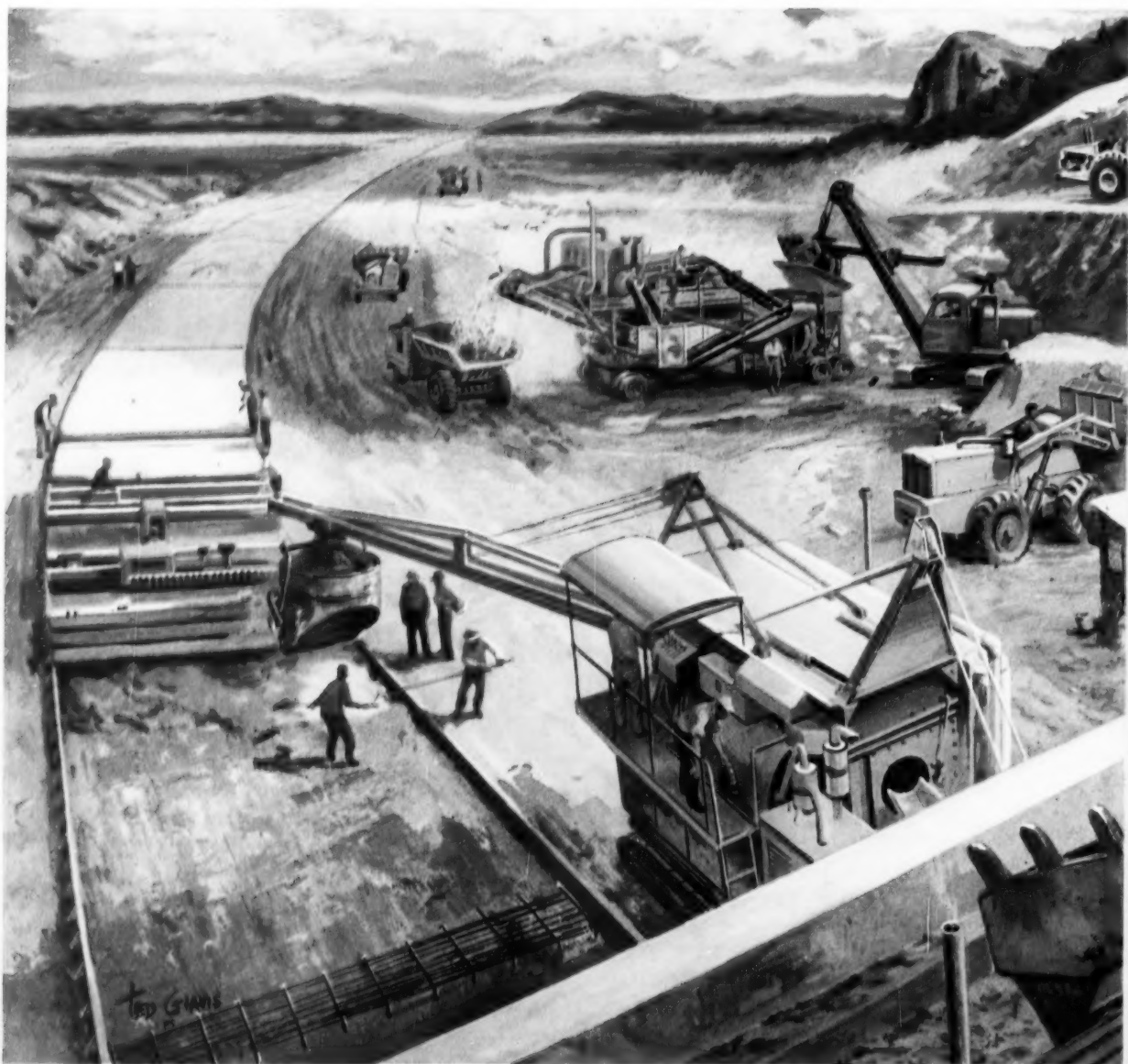
Let your D-A Representative give you all the facts on how D-A Lubricants can reduce parts wear and minimize downtime . . . *increase the return on your equipment investment.*

D-A Lubricants make equipment last longer



D-A LUBRICANT COMPANY, INC. • Indianapolis 23, Indiana

What's the most versatile



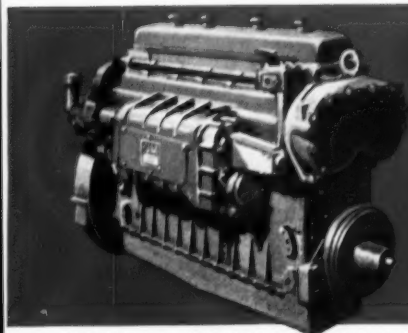
It's GM—Choice of more than 150 equipment builders

General Motors Detroit Diesel engines power more different types of road-building equipment—built by more manufacturers—than any other Diesel. These versatile two-cycle engines drive compressors, crushers, drills, pavers, graders, shovels and the world's most powerful off-highway vehicles. Leading manufacturers install GM Detroit Diesel power in more than 1000 different machinery applications because it gives their customers unequaled work output and dependability, plus the backing of a world-wide service organization.

Contractor experience has proved GM Detroit Diesel power more efficient than either gasoline engines or other Diesels on almost every kind of job from 30 H.P. up. And Detroit Diesel's new Turbopower engines deliver even higher efficiency—up to 17% more power on the same fuel, or the same work with fuel savings up to 15%!

You're money ahead when you specify GM Detroit Diesel power in any equipment you build, buy or repower. It's America's First Choice Diesel because it does more work at less cost!

Diesel in Road building ?



DETROIT DIESEL

Engine Division of General Motors
Detroit 28, Michigan

Regional Offices:

New York, Atlanta, Detroit, Chicago, Dallas, San Francisco

In Canada:

GENERAL MOTORS DIESEL LIMITED, London, Ontario

Single Engines...30 to 300 H.P.

Multiple Units...Up to 893 H.P.

HERE'S A NEWS BULLETIN

To keep users of explosives posted on the latest in blasting developments

You'll be up on new explosives products and blasting techniques that can give you more efficient, economical results when you become a regular reader of "Better Blasting."

"Better Blasting" is published as a technical service by Atlas Powder Company. Each quarterly issue contains important safety information and such features as loading procedures that pay off in better shots . . . methods that minimize noise and vibration, and assure improved public relations.

You'll especially look forward to "Mac's Notes," an interesting column by Dave McFarland, often called "the father of millisecond delay blasting."

Start "Better Blasting" coming your way—free of cost or obligation. Write Atlas to put your name on the mailing list.

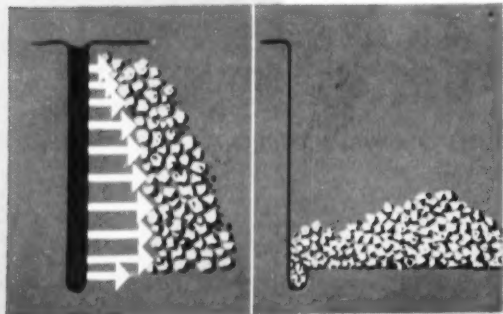
Ask also about the new Atlas safety movie, "How to Handle Women and Explosives" . . . or the public relations film, "We're Blasting Near You," which you can show to your neighbors to illustrate your efforts to minimize disturbance.



▲ This technical bulletin contains information that can help you get quieter, more efficient blasts.

◀ Every issue contains discussions on important blasting problems by D. M. McFarland, manager of the Technical Customer Service Section.

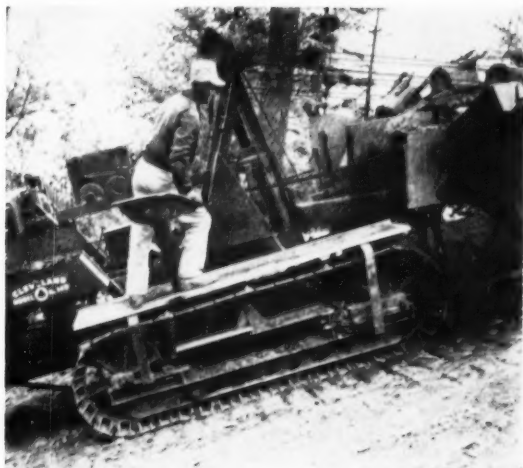
▼ New, improved blasting procedures are graphically explained. New materials are reviewed and evaluated.



EXPLOSIVES
DIVISION
ATLAS
POWDER COMPANY
WILMINGTON 99, DELAWARE
offices in principal cities



Cleveland 140 digs through rocky New Hampshire hills



"...exceeds wildest expectations"

"We got trench with our Cleverlands where we thought it would be impossible," says H. J. Burns of Hallen Construction Co., Island Park, N. Y., about a recently completed pipeline job for the Granite State Transmission Co., between Exeter and Somersworth in the rugged New Hampshire hills. The Hallen spread cut through numerous swamps and terrain strewn with boulders and choked with frequent outcroppings of rock.

"Our Cleveland 140 cut 24 miles of our 30-mile section—dug everything except the deepest swamps and solid ledge rock. It dug through shale and even handled boulders up to 6 and 8 cubic feet. Even in the toughest going the 140 never fell below 1,700 feet of trench per day and averaged 2,200 feet per day for the whole job."

Good



Everywhere

THE CLEVELAND TRENCHER COMPANY

20100 ST. CLAIR AVENUE • CLEVELAND 17, OHIO

B.F. Goodrich report:



Rubber turns a mountain inside out

B. F. Goodrich improvements in rubber brought extra savings

Problem: This is part of a 7-mile-long tunnel that will carry billions of gallons of water to a power plant. In digging the tunnel, they've practically turned a mountain inside out.

As fast as dirt and rocks (some of them boulders weighing 3000 pounds each) are blasted out, they're dumped on a rubber belt and carried away. But the smashing blows of 1½ ton rocks were pounding conveyor belts to death. Some split in two; others had their covers ripped off.

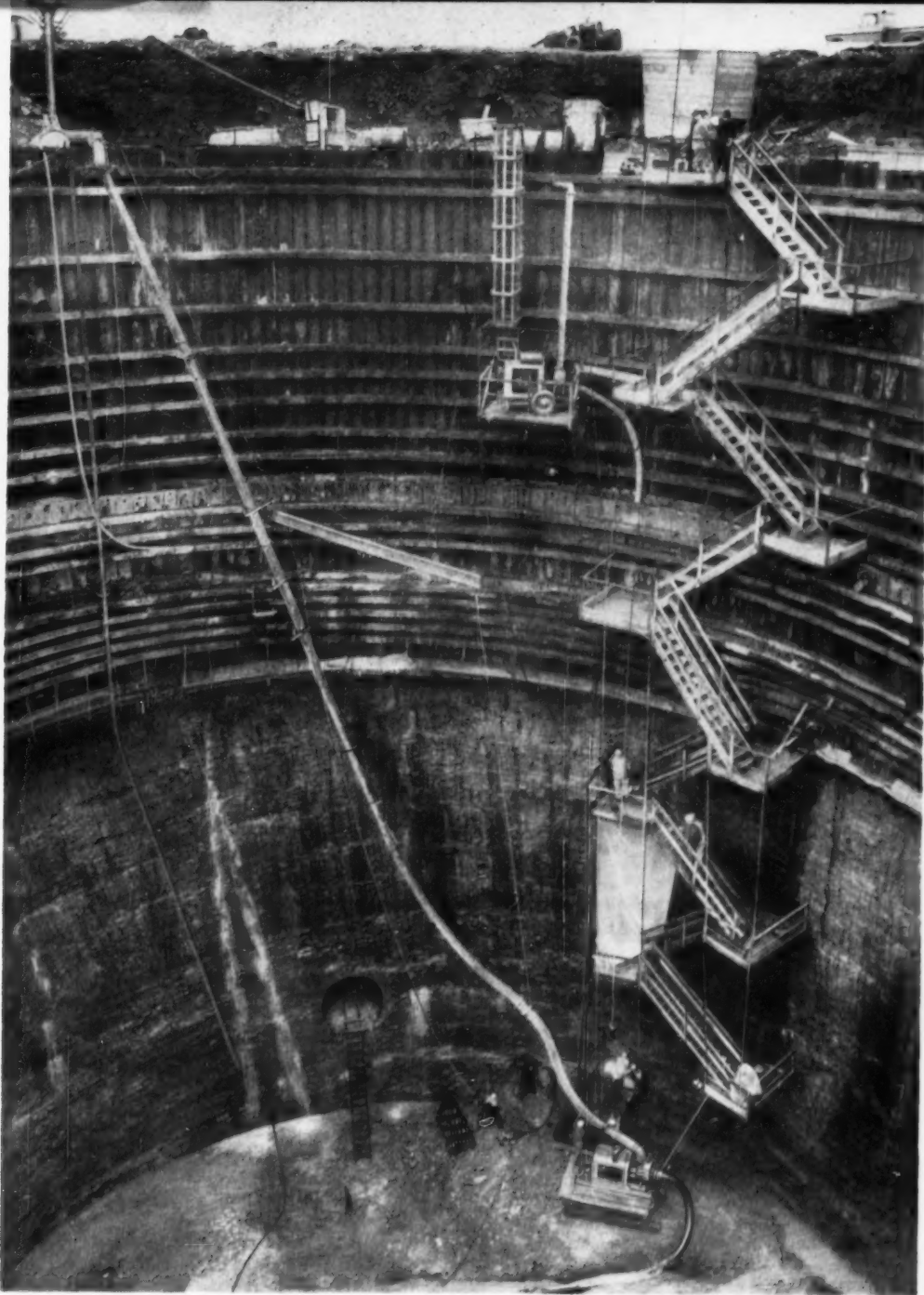
What was done: B.F. Goodrich engineers were asked to develop a belt that could stand the abuse. They started

with the B.F. Goodrich cord belt, so called because it has cords running lengthwise, buried in rubber. To this they added several layers of Nyfil fabric, which gives extra strength to the belt without making it heavy and bulky. Special rubber compounds were used for the cover to stand the cutting and gouging of the rock.

Savings: The B.F. Goodrich belt was put to work here. It stood the banging, crashing better than any belt previously used. It lasted longer, carried more tons. B.F. Goodrich belts have now carried two-thirds of all the rock hauled out of here.

Where to buy: Your B.F. Goodrich distributor has full information on the conveyor belt described here. And, as a factory-trained specialist in rubber products, he can answer your questions about *all* the rubber products B.F. Goodrich makes for industry. B.F. Goodrich Industrial Products Co., Dept. M-948, Akron 18, Ohio.

B.F. Goodrich
INDUSTRIAL PRODUCTS



The Battle of the Big Hole

• Draining this riverside excavation 127 ft below grade and 100 ft in dia is a constant battle. The top 60 ft, held by sheetpiling, is in water-bearing soil, and the bottom 67 ft goes through wet-seamed rock. The 10-in. Jaeger centrifugal pump at the bottom operates 24 hr a day, pushing 1,500 gpm through a 250-ft discharge line that rises vertically more than 120 ft. A 6-in. Jaeger pump at the collector ring drains the top portion. The excavation is for the 300 mgd pumping station of Pittsburgh's \$100 million trunk sewer and treatment plant. Joint venture excavation contractor is McHugh, Allegheny & Drake.

**PICTURE
OF THE
MONTH**

27 cu. yds.



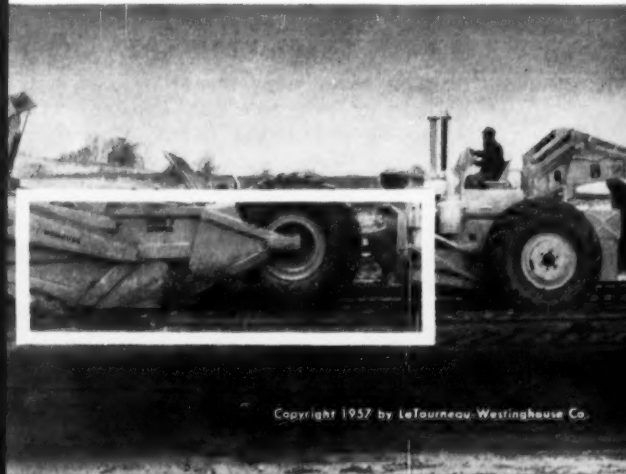
MORE FOR YOUR MONEY

Low-and-wide Fullpak Scraper produces more at lowest-net-cost-per-yard

This easy-loading LeTourneau-Westinghouse 27-yard Fullpak Scraper is the result of building more than 13,000 self-propelled scraper units over a period of more than 19 years. Its basic low-and-wide design has been thoroughly field-tested on hundreds of 18-yd. Model C Tournapulls on jobs all over the world. Using the same pusher in the same materials, the new 27-yd. B Fullpak gets heaped loads in approximately same time as most medium-size scrapers.

Direct-line thrust from pusher to cutting edge . . . cuts loading time

Large-size push-plate is positioned low, with angle of thrust in direct line with cutting edge of scraper bowl. There is no "humping action" of pusher or scraper. Direct-line thrust steadies scraper, keeps pusher on the ground, makes use of all push-power available. Scraper floor has a rise of only 1° when blade is on ground. Materials move in easily, with smallest possible resistance. This all adds up to easy loading . . . faster loading . . . bigger production.



Copyright 1957 by LeTourneau-Westinghouse Co.

heaped

19.1 cu. yds., struck; choice of 300 hp GM or 293 hp Cummins engine; 10 forward speeds to 28.4 mph; 27 x 33 — 30-ply rating tires; 180° turns in 39'10"; positive fingertip electric controls



27-yard "B" gets capacity load of red clay in less than a minute, pushed by 420 hp LaTourneau-Westinghouse Twin-C' push-tractor.

with new easy-loading Fullpak* Scraper and new Big B Tournapull®

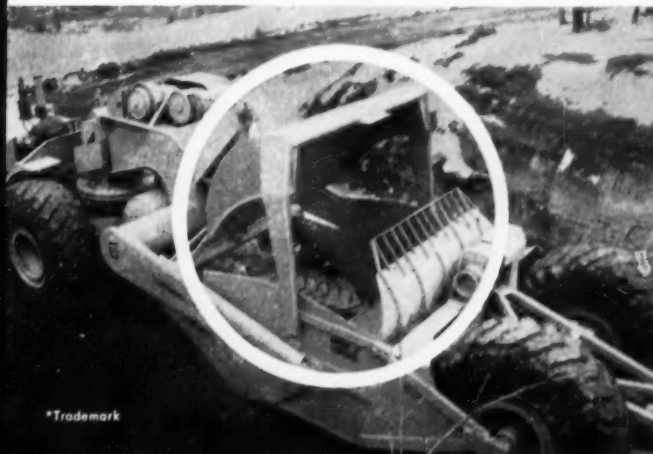
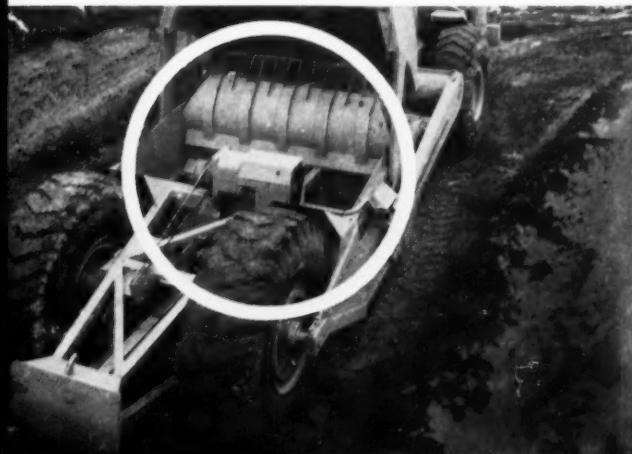
Positive power ejection ... faster spreading

At the touch of an electric switch, operator moves vertical tailgate forward to eject load. Tailgate wipes bowl clean of mud, marl, or sticky clay in a single pass. Inside of bowl is cleanly designed, no angular obstructions to block material flow. With fingertip electric control, tailgate may be moved to any position in the bowl to create lively boil of material while loading. Curved top of tailgate rolls material into corners for fast fill and rounded heap.

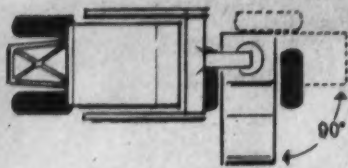
High-lift apron makes sure anything that goes in comes out — fast

Apron lifts quickly to make an opening 10' wide x 7'1" high. Plenty of clearance to handle hunks of sod or gumbo, rocks, and other chunky materials. Deflectors on yoke arms prevent trapping of stones and sticky clay that might require manual cleaning. Large-diameter cable-drum on apron-hoist permits fast spooling without kinking, increases rope life. In closed position, apron carries big part of load for better distribution of weight, greater stability.

Turn page for more →

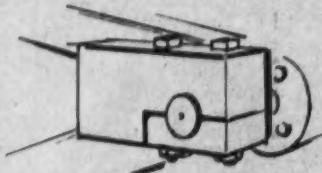


*Trademark



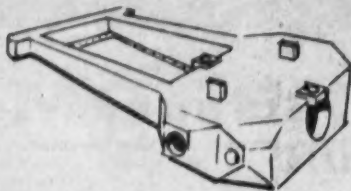
SHARP TURNS

...90° turning ability permits the "B" to turn in a space 4'2" less than its own length.



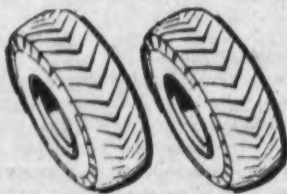
HIGH-STRENGTH

...high-grade metals, heat-treated and stress relieved, keep maintenance costs low, increase service life.



RIGID MAIN CASE

...of 1" and 1½" steel plate, maintains perfect alignment, absorbs stress and strain.



LOAD-RATED TIRES

...plenty of load-carrying capacity in big 27 x 33, 30-ply rating tires which are interchangeable all around.



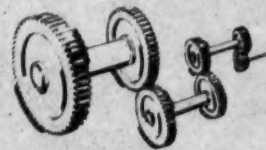
ANTI-FRICTION BEARINGS

...are used throughout to prolong life and increase the efficiency of entire drive train.



STRONGER AXLE

...massive heat-treated component that takes a severe beating. Brake elements are built to give long, trouble-free service.



PRECISION GEARS

...accurately cut and hardened, to resist shock and assure smooth operation.

Additional B Tournapull® advantages that give you MORE FOR YOUR MONEY

It takes more than a bat and a ball to make a home run hitter. The player with a high batting average must have strength, keen eyesight, and a sense of coordination that inspires split-second timing. He must be fast on the swing, fast on his feet, and in sound physical condition to last through extra innings of play.

The same is true of your self-propelled earthmover. Prime-mover, scraper, tires, power, and controls all must be in perfect balance and coordination to get maximum production with greatest efficiency. That is what LeTourneau-Westinghouse engineering and long experience give you in the new B Tournapull. In addition to its low-and-wide, easy-loading Fullpak® bowl, the new B Tournapull includes many features that add up to "more for your money". For example, the "B" gives you:

Exclusive LeTourneau-Westinghouse power-transfer differential ... automatically diverts power to wheel on firmest footing when opposite wheel begins to slip. The "B" keeps on working in soft footing when other rigs bog down.

90° turn-ability, enables the "B" to make complete turn in 39'10" ... a space 4'2" less than its own length. Works in restricted areas. Power-steer, through geared kingpin, swings prime-mover side-to-side in soft going, "walks" machine out of slippery mud and loose sand.

Big multiple-disc air brakes on all 4 wheels, with a total of 6552 sq. in. of braking surface assure quick, safe stops. For additional braking power on steep grades an electrotarder is available (as extra equipment).

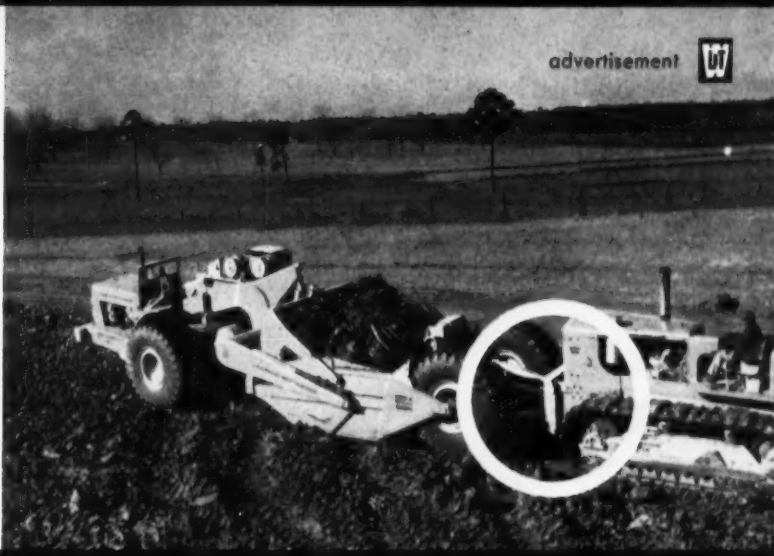
Choice of 300 hp GM or 293 hp Cummins engine is offered for the Big "B". Choice of engine helps to minimize your parts requirements, hold maintenance costs to minimum.

These exclusive features, in addition to the other advantages described in this 6-page advertisement, show why B Tournapull with Fullpak Scraper can give you *more for your money* ... earn bigger dividends on your equipment investment.



More pay-yards with same pusher-power

B Tournapull, with 27-yard Fullpak Scraper, gives you more pay-yards with the same pusher used to load 18 to 25-yd. scrapers. Because of its easy-loading advantages, the Big "B" heaps in record time, without need for tandem pushers. This saves man-hours and pusher costs... gives another "plus" advantage to owners of new B Tournapull.



More visibility... assures faster loading and spreading

Operator seat on new "B" is high and left-of-center. Operator can see blade, load, and pusher merely by turning his head. This makes it easy to position machine for better coordination with push-tractor and see signal for quick break-away the moment load is heaped. He can guide the big machine easily along narrow haul-roads, in the pit, on fill, and over rough terrain.



More speed... with instant, positive electric controls

An exclusive advantage on all LeTourneau-Westinghouse earthmovers. With fingertip electric controls, operator handles all movements of bowl, apron, and tailgate. He has power-steering, too, as on a modern automobile. He sits in a comfortable foam-rubber seat... with hands resting comfortably on wheel and control panel. No twisting of body or stretching of arms to reach awkward levers... your Tournapull operator works relaxed... he concentrates on getting bigger loads in less time... to give you "more for your money"



Turn page for more →

— More for your money (continued)



35-ton Rear-Dump

There are times when you need an off-road hauler to handle shovel-loaded materials. To meet these requirements you can interchange your Fullpak Scraper with a 35-ton B Rear-Dump . . . keep your Tournapull prime-mover working . . . avoid the need for standby trucks and operators. You'll find the B Rear-Dump a handy tool in tight places. It makes 180° turns in 35' . . . less than its overall length . . . travels in rough going where trucks cannot go. In dump position it makes a complete turn in 27'. Its bowl measures 15'6" x 10'2", offering a big target for dragline or shovel. It dumps over-the-edge clean and safe, because its streamlined body swings behind and below rear wheels to discharge load, and front-wheel drive keeps power and traction on solid footing. The B Tournapull Rear-Dump helps you cut costs, make quick profits.

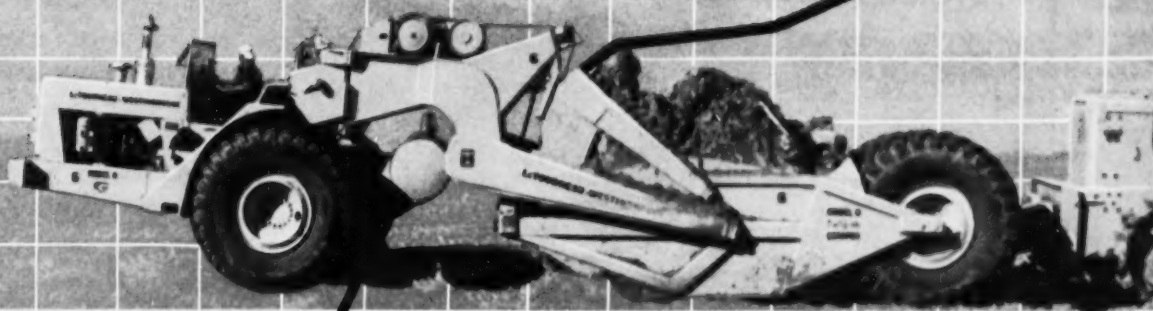
**To get more
for your
money . . .**

interchange
27-yd. Fullpak*
Scraper with
other haul units
behind Big
B Tournapull*
prime-mover

30-ton Lift-and-Carry Crane

For stacking bridge steel, handling pipe, culverts, and pre-cast concrete sections, unloading trucks and railway cars, lifting heavy machines and parts . . . you'll find the B Lift-and-Carry Crane a profitable tool for both yard and on-site service. It may be interchanged easily with Rear-Dump or Fullpak Scraper units. This 30-ton mobile crane goes anywhere, maneuvers easily in tight places. It has a maximum lift to 24'9" and a reach of 25'. It is especially useful on occasional jobs where heavy materials must be lifted and carried over distances that would otherwise require flat-bed haulers . . . often eliminates need for building access roads. It is another application of the B Tournapull prime-mover and a specially designed trailing unit which can help materially to increase the money-making possibilities of the heavy haulers in your equipment spread.





PROFITS INCREASE WITH PRODUCTION

**Your investment in Big B Tournapulls...
with 27-yd. Fullpak Scrapers... will bring
bigger earnings on big-yardage hauls**

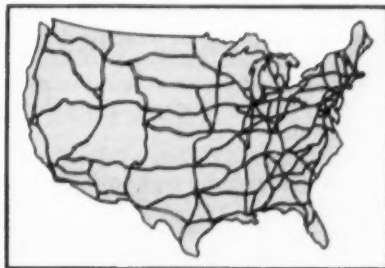
Because of its easy-loading advantages, you can use the new Big B Tournapull on cuts normally assigned to smaller-yardage earth-movers. Its ability to get big loads fast, its short-turn radius, its speed and maneuverability, its low center of gravity and load-rated tires... make this machine a pace-setter on most any length cycle and on practically every production job. You can figure it on paper, if you will... or call on your nearby LeTourneau-Westinghouse Distributor to demonstrate the facts.

If you are considering new scrapers to augment your present fleet, let's put all the facts down in black-and-white. Be realistic... examine every phase of the work you expect the "B" to do... figure your cost on a conservative ownership-operating basis... compare the result with your present yardage costs.

Then let us show you a new B Tournapull in action. When you see for yourself how easily the low-and-wide Fullpak Scraper scoops its load... packs material quickly in all corners of the bowl... and pulls out of the pit while dirt still settles on its capacity heap... you'll know why the Big "B" has a place in your future equipment spread.

**Standardize your rubber-tired
fleet... for lower maintenance**

Check your rubber-tired fleet maintenance costs. Inventory your average stock of parts. Figure cost of warehouse space, manpower, and interest on your investment. Then talk to a fleet owner who has standardized on LeTourneau-Westinghouse electric-control, rubber-tired equipment. He will point out how much less storage space is required, and show you why L-W machines involve a smaller investment. You'll find he carries a much smaller stock of cable, grease fittings, couplers, and many other small parts. In fact, you will find you can carry less of nearly everything to keep your fleet in top operating condition. Today's L-W electric-control tractors and scrapers give you more for your money in the shop as well as on the job. It will pay you to standardize on LeTourneau-Westinghouse equipment. Look into it!



FREE... colorful 28" x 17" map showing U.S. Interstate Highway System. You'll want it for your wall or reference file. Write for your copy.

*Trademark BP-1444-G



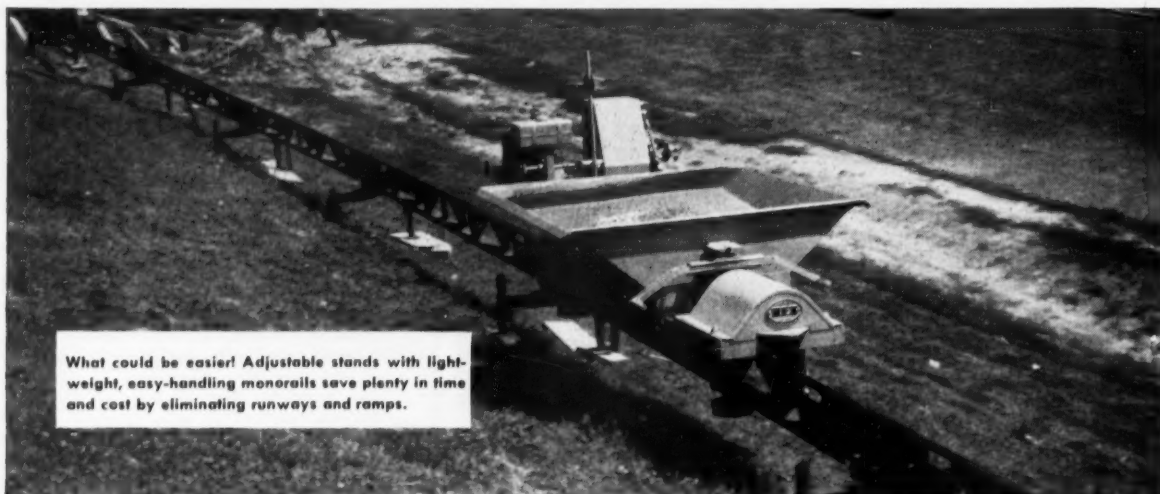
LeTourneau-WESTINGHOUSE Company, PEORIA, ILLINOIS
A Subsidiary of Westinghouse Air Brake Company

Where quality is a habit

TRICKY CONCRETE HANDLING PROBLEM...



500' nonstop from mixer to pouring site. Note end of Railporter monorail system in lower left foreground ...and its long travel path to end of stadium tiers and up grade in far background.



What could be easier! Adjustable stands with lightweight, easy-handling monorails save plenty in time and cost by eliminating runways and ramps.

solved by **REX** RAILPORTER

Schroeder Construction Company, St. Joseph, Mo., faced a tough one on this stadium job. Contract called for placing a new concrete slab 4" thick. The big problem: getting concrete 500' down steep incline from mixer to tiers.

Rex Railporter proved the best solution. It spared three separate handling operations, did the job in one. From ready-mix truck, Railporter traveled unattended...going downhill, making turns, moving right to pour locations. It saved ramps, runways...prevented congestion, material segregation.

Rex Railporter is the modern, money-saving materials mover that operates on its own between two points. It has single-lever forward and reverse, with automatic stopping at any point. It rides a single, lightweight rail...is fast, easy to set up. See for yourself all the advantages of this

simple, rugged, self-propelled unit that handles loads for far less, picks up valuable time with nonstop operation. Write CHAIN Belt Company, 4664 W. Greenfield Ave., Milwaukee 1, Wis.

in the General Superintendent's own words:

"This job was a natural for Railporter...and saved endless time on setups and handling. Don't know how job could have been completed so successfully any other way."

The full report on Rex Railporter, including many interesting job applications, is contained in this well-illustrated catalog. Ask for yours...it's Bulletin 56-47.

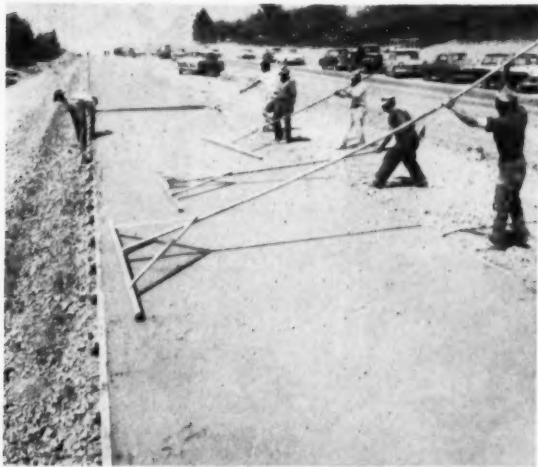


MOTO-MIXERS • BUILDING MIXERS • PUMPCRETE • RAILPORTER • PUMPS

CHAIN BELT COMPANY

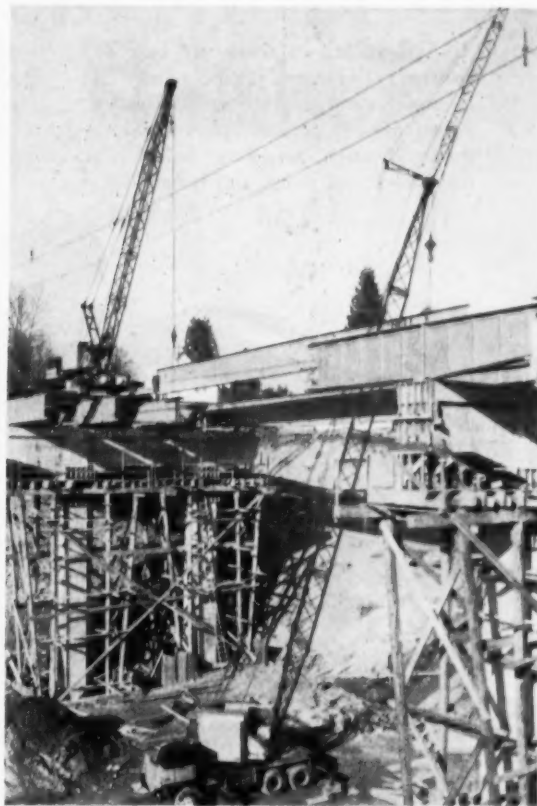
PAVERS • SPREADERS • FINISHERS • FLOATS • CURING MACHINES • FORMS

Construction News in Pictures . . .



Jointless Highway

Workmen finish an experimental "continuous" reinforced concrete highway — without contraction joints—near Hamburg, Pa. The job is a research project sponsored by Lehigh University, the American Iron and Steel Institute, the Pennsylvania Department of Highways, and the Bureau of Public Roads. Tests will determine if increasing the quantities of reinforcing steel will eliminate the need for joints.



One Up, One Down

Two Lorain Moto-Cranes set heavy steel trusses for a bridge at Olympia, Wash., at the rate of four a day. Trusses 105 ft long weighing up to 27 tons are trucked to a 35-ton crane working on the bridge which swings them around 180 deg. Then the 25-ton crane operating at the bottom of the cut 60 ft below bridge level hooks onto one end of the truss and helps position it. Contractor is Isaacson Iron Works.

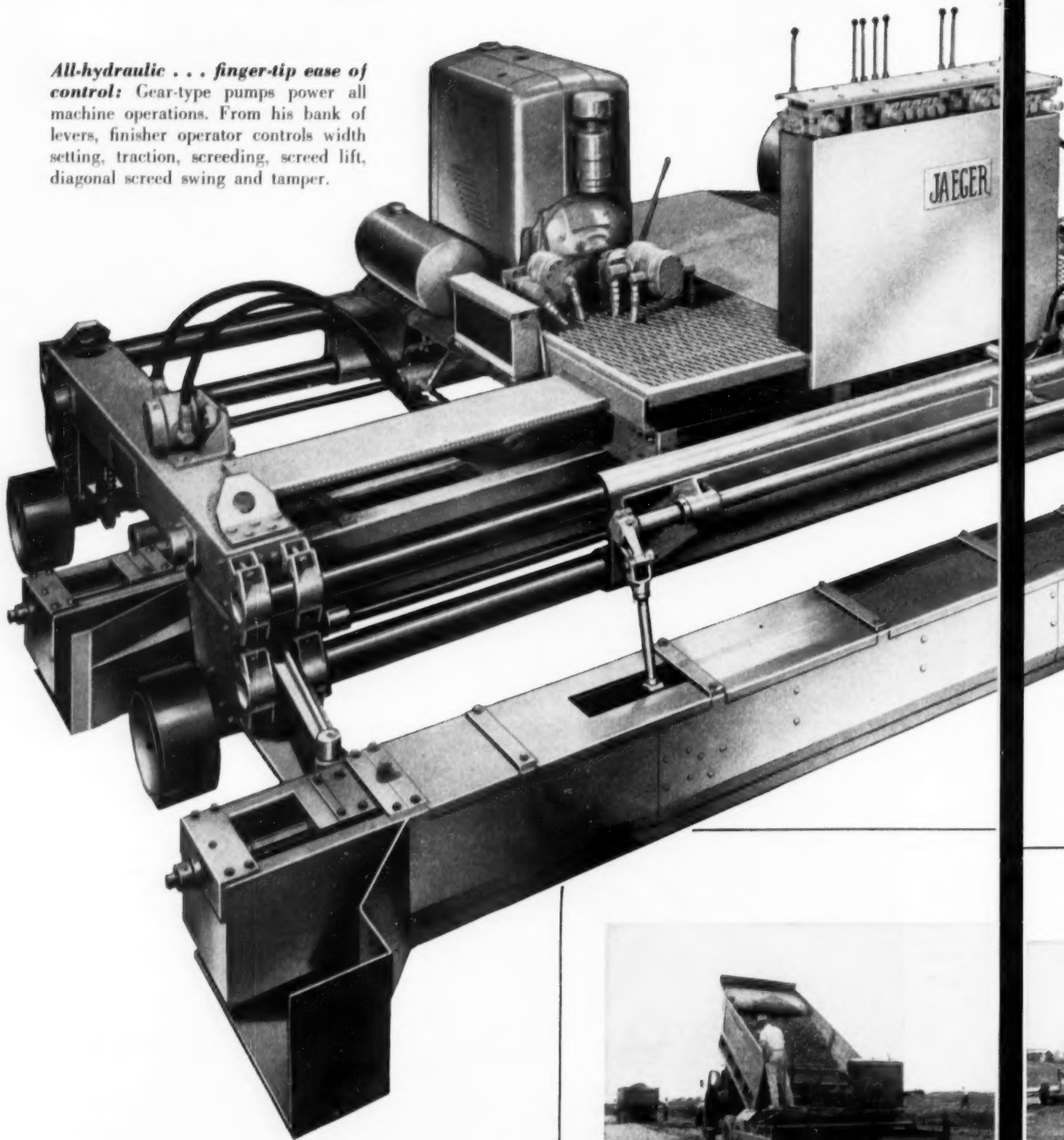


Big Job Completed

The \$100 million third tube of the Lincoln Tunnel under the Hudson River between New York City and New Jersey was opened to traffic May 25. Final step in the 4½-year construction job was laying an asphaltic concrete wearing course bonded to the reinforced concrete roadway base. Standard Bitulithic Co. of Newark, N.J., completed the 8,000-ft, two-lane paving job in one week, working 12-hr days.

continued on page 84

All-hydraulic . . . finger-tip ease of control: Gear-type pumps power all machine operations. From his bank of levers, finisher operator controls width setting, traction, screeding, screed lift, diagonal screed swing and tamper.



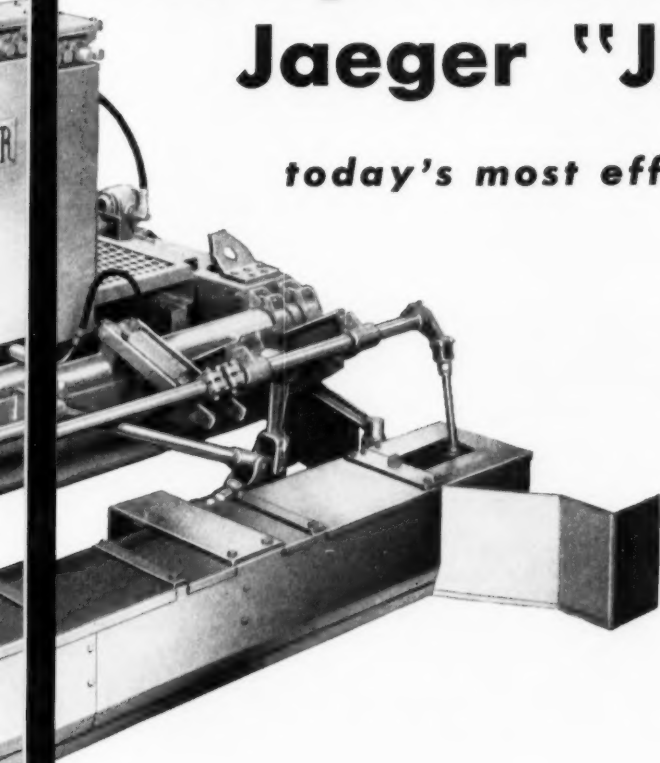
6' of infinite width adjustability, with the touch of a lever: Hydraulic power extends telescopic tubular frame as desired, up to 3' on each side—6' in all. A tremendous time and labor-saving advantage on today's work where gradual width changes are increasingly required.



Ideal for laying stone for highway and airport base.

All-hydraulic self-widening Jaeger "JX" Finisher

today's most efficient paving tool



Complete hydraulic operation—Finger-tip control: Touch a lever to change machine width up to 6' and to perform every travel and screed operation, including diagonal setting of rear screed, by smooth hydraulic power. No mechanical transmissions or clutches. Even tamper attachment and transportation mounting are hydraulically operated.

6' of infinite width adjustability—by hydraulic power: 12'-18' and 24'-30' are standard; special widths from 9' available.

Diagonal rear screed for pitched slab and curves: Adjustable as needed to work material up-hill and compact it against higher form. Saves carry-back. Quick crown change screeds adjust with single lever movement. (Conventional screeds and transverse rear screed, optional.)

Vibratory "bullnose" front screed or vibratory pan or tube attachments. Traction wheels for every condition.

You're years ahead in finishing capacity and precision with a Jaeger Type "J" or "JX" finisher. See your Jaeger distributor, or write for complete data, today.

THE JAEGER MACHINE COMPANY

800 Dublin Avenue, Columbus 16, Ohio

Distributors in More Than 150 Cities of U. S. and Canada

Low Cost Jaeger Aggregate Spreader Does Big Work



Laying 200 tons of base mix an hour, in four 3" courses.

If you have a job of laying base or surface aggregate up to 13' widths and 12" thickness, or plant-mixed stabilized soil or any free-flowing bituminous material, you can save yourself money with a Jaeger self-propelled SPS-3 spreader. Costs only half the price of a bituminous paver; lays highway and airport base, and both base and top of secondary roads, parking areas and drives as fast as trucks can deliver material. Crawlers operate on subgrade—no traction on newly-laid material to cause high or low spots. Straightedge runners, supporting strike-off, average out subgrade irregularities. Blender gates and wings make perfect joints. Agitator bar attachment for handling stiff stabilized soil mixtures, if desired. Get new Catalog SPS-7.

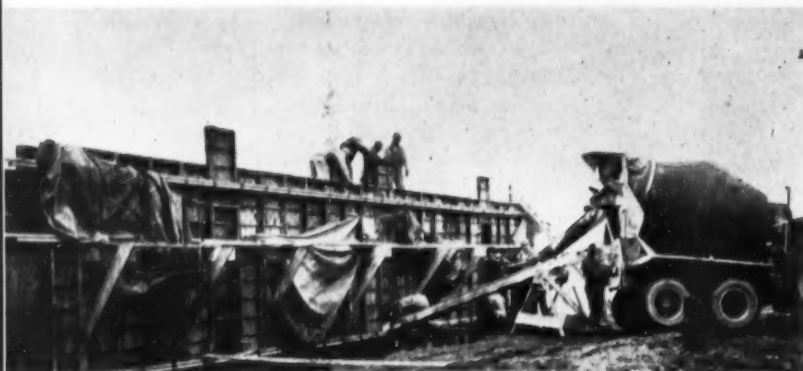
CONSTRUCTION NEWS IN PICTURES . . .

continued



Curing Concrete

On the Texas Turnpike, Flenniken Construction Co. and L. H. Lacy Co. of Dallas cure fresh concrete by draping a blanket of opaque white Bakelite polyethylene film over it. Enough film to cover 1,000 sq ft of the highway weighs less than 20 lb and is easier to lay down than paper. Workmen pile dirt along the edges of the film blanket to assure a snug fit and to prevent the wind from blowing the film out of place.



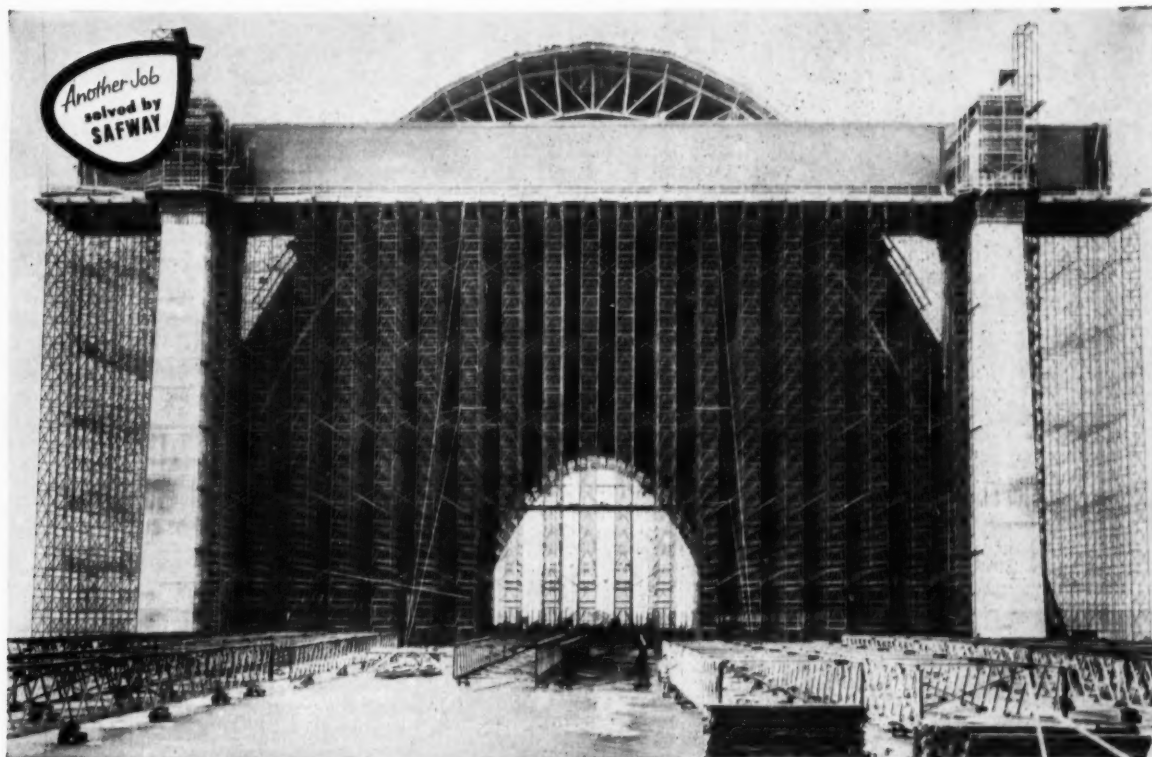
Pocket Pour

Chuting concrete through pockets in the forms enables M. H. Wolfe & Co. of Granite City, Ill., to make continuous pours of 50-ft wall sections in heights up to 18 ft. The job is a \$1 million water reservoir for the Granite City Steel Co. Outer walls are 15 in. thick; inner walls, 12 in. thick. The contractor uses 7,000 sq ft of Symons 8-ft form panels to pour the wall concrete.

Speedy Wrecker

With the help of a Bucyrus-Erie H-5 Hydrocrane, Lucas Wrecking and Salvage Co. of Paramount, Calif., makes quick work of wrecking houses to make way for another Los Angeles freeway. Lucas removes six to eight houses a day with a crew of only three men—the crane operator and two truck drivers. The hydraulically controlled jaws of the clamshell bucket chew up a small home in just one hour.





50 Safway Steel Scaffold Towers Support 20 tons Each on Naval Aircraft Hangar Job

How to Shore 500-ton Beams 120 ft. High

3,000 LB. LOAD IS SUPPORTED BY EACH STEEL SCAFFOLD LEG

NOT EVERY JOB calls for shoring two great 500-ton concrete beams at a height of 120 ft. But even when they do, you can solve the problem efficiently... *and at lowest cost*... with standard, portable steel Safway Scaffolding.

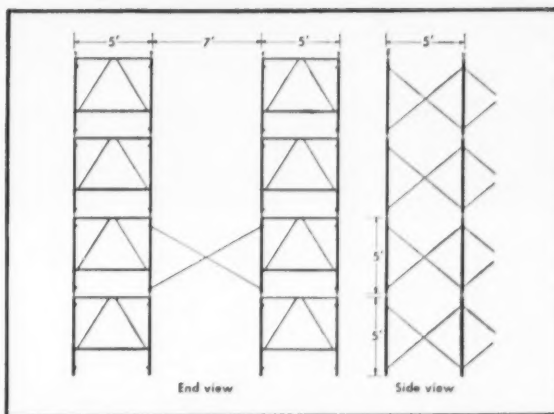
Beams for this giant U. S. Navy aircraft hangar were constructed quickly and safely, supported by 50 Safway Scaffold towers with a base area of 5 x 30 ft. each. The built-in strength of Safway frames plus engineered bracing made it possible for each tower to carry 20 tons. This amounts to almost 3,000 lbs. per leg supported 120 ft. high.

Adjusting screws at the top and bottom of each tower permit leveling the structure on uneven ground, and final setting of the formwork. They also simplify lowering and dismantling of the scaffolding when the job is finished.

100% RECOVERY OF EQUIPMENT

Balanced Safway frames are easily handled by one man at any level. They go up rapidly to any height without a crane. Their capacity is definitely known. And when they are dismantled, you recapture 100% of your shoring equipment.

Safway scaffold engineers are available at any time to help you plan for both unusual and routine jobs. And you can always rely on your local Safway dealer to deliver an ample supply of Safway equipment... when and where needed... for purchase or rental!



Each of the 50 scaffold towers is 7 frames deep, spaced at 5 ft. intervals. Additional bracing between towers unifies the structure, distributing shock loads evenly. Safway center-pivoted tubular steel cross braces square the shoring columns into rigid structural members.

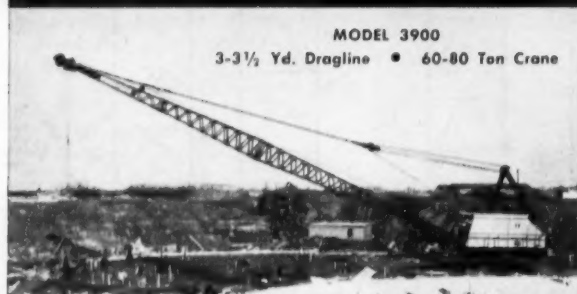
CONSULT WITH SAFWAY—Shore all your jobs better—save construction costs! Submit details for Safway recommendations. And **WRITE TODAY FOR BULLETIN 26.**





Big 5½-yd. Manitowoc Model 4500 has single diesel power package—no complicated electric motors. You get the big capacity needed for modern construction jobs, plus . . . flexible, small-machine maneuverability.

Right down the line—Manitowoc . . .



MODEL 3900

3-3½ Yd. Dragline • 60-80 Ton Crane



MODEL 2800

1½ Yd. Dragline • 40 Ton Crane



MODEL 3500

2½ Yd. Dragline • 60 Ton Crane

Lower Bids...More Profit With MANITOWOC

To get your share of the construction dollar you want a rig that can give you all the features you need to be low bidder . . . at a profit. One that crowds into the bank with smooth, steady power; swings fast; and dumps clean — with the speed that's necessary to complete contracts on time.

Manitowoc offers more power when the going is rough, greater cycle speed for more yardage, and longer machine life from every unit to keep maintenance costs way down. You'll find your only real competitor is another Manitowoc owner! Capacities range from the fast, rugged 1-yd. Model 1600 to the big, powerful 5½-yd. Model 4500 — a full line to let you meet all job requirements.

You get more bite at the dipper with any Manitowoc because of an exceptionally efficient, simple upper works design. An exclusive sliding pinion arrangement provides fast, smooth operating speeds with direct power flow — eliminates unnecessary power-robbing gears and pinions. Sturdy construction throughout guarantees years of extra service with less downtime.

Massive carbodies and large, wide crawlers assure safe stability for any job. A simple, rugged travel drive and positive steering take your Manitowoc with fast, sure mobility over the roughest terrain.

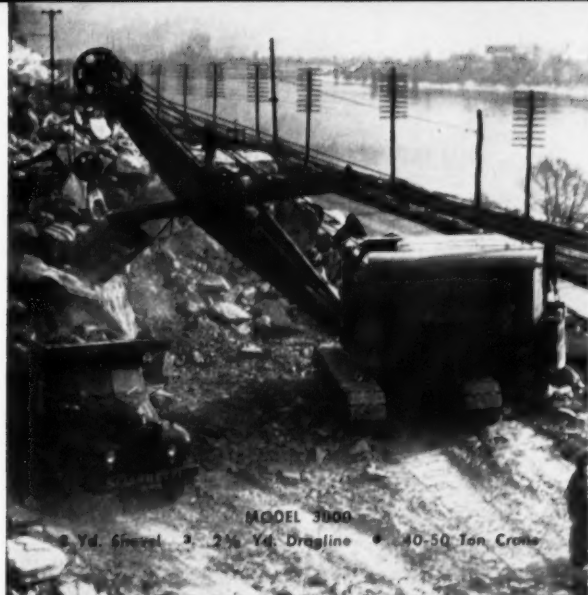
Optional features like air controls, torque converter power and elevated cabs increase operator efficiency and comfort — help to finish work ahead of schedule. And all Manitowocs are easily convertible for a variety of assignments.

Find out why more and more successful contractors are turning to Manitowoc for additional profit per job. Your helpful Manitowoc distributor has complete specifications and details on the entire line of quality Manitowoc excavators and cranes. See him now for current delivery information.

Manitowoc Engineering Corp., Manitowoc, Wisconsin.



means more machine for your dollar!



MODEL 3000

3 Yd. Shovel • 2 1/2 Yd. Dragline • 40-50 Ton Crane



MODEL 2000

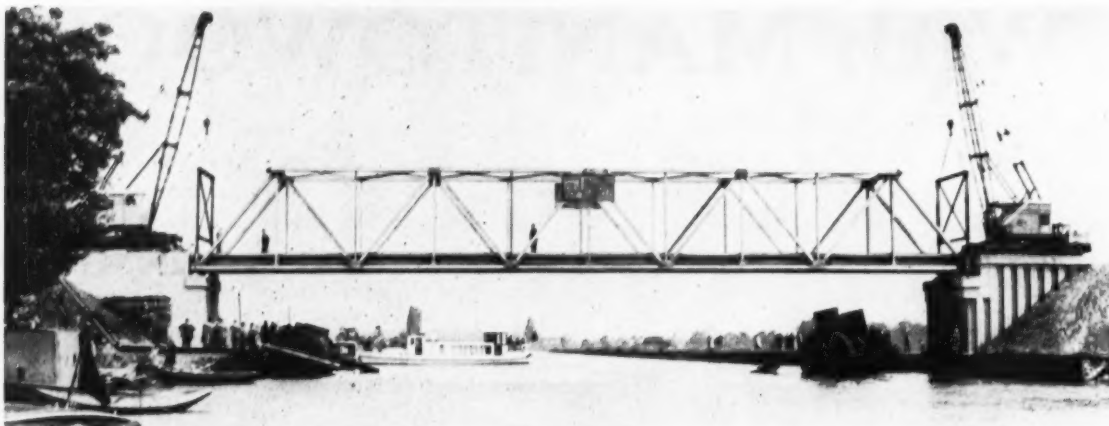
1 1/2 Yd. Dragline • 25 Ton Crane
1 1/4 Yd. Shovel & Trench Hoe



MODEL 1600

1 Yd. Shovel & Trench Hoe • 1 1/4 Yd. Dragline • 20 Ton Crane

Construction 'Round the World . . .



In Germany

Cranes position the first all-aluminum bridge in Germany across the Dattel-Hamm Canal. Decking consists of aluminum profiles covered with a 5-in. asphalt surface. The bridge is about 120 ft long and weighs only 25 tons. It was assembled at a plant of Dortmunder Union Brueckenbau and towed 20 miles on two floats to the site.

In Canada ▶

Dominion crane erects tall, heavy column for new strip mill at Steel Company of Canada's big Hamilton, Ont., plant. It's part of a multi-million dollar expansion program for which Pigott Construction Co. Ltd. is general contractor. Owner and contractor have cooperated in an effective "hard hat" campaign that keeps job safe.



In Spain

Barge-mounted McKiernan-Terry pile hammer drives batter piles for a pier at the \$65 million U.S. naval base at Rota in Cadiz Bay. The rig handles H-piles up to 120 ft long. Corbetta-Coviles, a joint venture of Corbetta Construction Co. of New York and Construcciones Civiles of Madrid are driving a total of 1,100 piles for the pier.





KOR-IT actually cores precision-cut holes through concrete in minutes

HOW IS IT DONE? KOR-IT and KOR-IT, JR. use the extraordinary KOR-IT cutting bit, impregnated with industrial diamonds. The equipment is exceedingly light and mobile. KOR-IT, JR. is so light and portable that it is easily carried through small openings, up steel ladders, wherever a man can go.

Here's a precision hole-boring instrument long needed by contractors, especially for plumbing, electrical wiring, heating and ventilating jobs. Heavy duty KOR-IT and the smaller JR. each cut a clean, smooth hole through thick, hard walls—even re-

inforcing bars—like boring into soft wood! Diameters up to 8", and depths to 7 ft. and more, are cut through smoothly, quietly at speeds up to 6" per minute depending on hardness of material.

CHICAGO CONTRACTOR SAVES 172 MAN HOURS

ECONOMY PLUMBING & HEATING CO., Chicago, says: "Six months ago we purchased a KOR-IT concrete hole-cutting machine. We have used this machine regularly and have found by actual record that we have saved 172 man hours of labor.

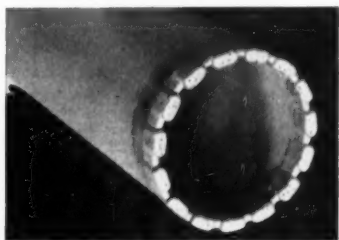
We have had many favorable comments from our customers concerning the neat openings our men are drilling into hard concrete walls and floors.

We are highly pleased with our machine and thought you would like this information for your files."

CUSTOM DRILLING WITH KOR-IT

There is a great need for custom drilling. With Kor-It equipment you'll find it profitable to service this need.

Write today for complete illustrated information about KOR-IT precision drills and Kor-It diamond bits. Use convenient coupon.



Boring bits impregnated with diamonds, set in high-test metal.



KOR-IT, Jr. cutting 2" diam. holes through concrete wall inside an office. Completed in a matter of minutes, without interference to anyone. No dust. No mess. No broken areas to patch or repaint.



Core is removed in a solid piece without dust or mess.

KOR-IT cuts round holes 1" to 8" dia. and 10" deep, plus 9" extensions as required. 2 hp. G. E. motor, 110-220 volts; or 3½ hp. gasoline engine. Machine counterbalanced to exert correct pressure. Operates any position, vertical to horizontal. Compact, portable. Total weight 165 lbs.

KOR-IT, Jr. cuts round holes 3/16" to 2" dia. and 8" deep, plus 8" extensions as required. ½ hp. G. E. motor, 110-220 volts. Works in places not accessible to other equipment. Compact, portable. Total weight 36 lbs.

J. F. HAMLIN CO., INC. • 746 ELLIS STREET • SAN FRANCISCO 9

KOR-IT

CUTS CLEAN, ROUND
HOLES THROUGH HARD
SURFACES AT HIGH SPEED

J. F. HAMLIN CO., INC.
746 Ellis Street, San Francisco 9, California

CM67

Gentlemen:

Send me information about KOR-IT drilling equipment.

NAME..... TITLE.....

COMPANY.....

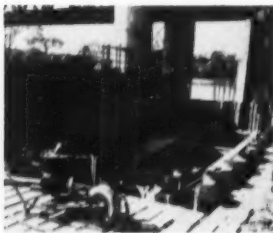
STREET.....

CITY..... ZONE..... STATE.....

IS YOUR JOB HERE— USING STEEL-SHEET PILING?

All these jobs moved on schedule, with no delays,
no capital tie-up, no substitute lengths or sections.

They all used the ***“FOSTER PILING RENTAL PLAN”***



Colorado River Bridge Eagle Lake, Tex.
Bob Baker Construction Company



Penn-Lincoln Parkway Pittsburgh, Pa.
John F. Casey Company



Portland Oregon Bridge
Manson Construction & Engineering Co.



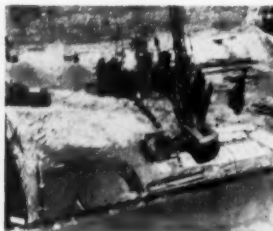
Post-Tribune Building Gary, Ind.
Prosser Howells, Inc.



Murchison Tower Bldg. Denver, Col.
Mead and Mount Construction Co.



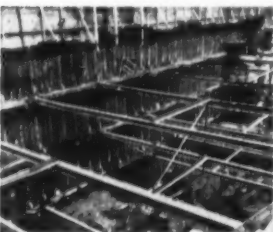
Boston & Maine Railroad
Grade Crossings Winchester, Mass.
C. J. Maney Construction Co.



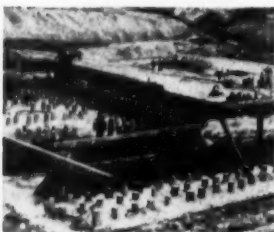
Fulton County Savings and Loan Association
Office Bldg. Atlanta, Ga.
J. A. Jones Construction Company



Austin Power Plant No. 2 Austin, Tex.
Brown & Root, Inc.



Mellon Square Garage Pittsburgh, Pa.
H. K. Ferguson Company
Equipment & Supplies Inc.—Sub.



Mississippi Power Co. Plant, Gulfport, Miss.
Southern Services, Inc.
Boh Brothers Construction Co.



Chase Manhattan Bank Bldg. New York
Turner Construction Company
Thomas Crimmins Contracting Co.



Tide Water Associated Oil Co.
Avon Flying A Refinery Associated, Cal.
Bechtel Corporation



**H-BEARING
PILE**

8" 10" 12" 14"

FROM FOSTER'S
WAREHOUSE STOCKS

STEEL-SHEET PILING • PIPE PILE • H-BEARING PILE • RAIL PILE • PIPE • RAILS

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PITTSBURGH • NEW YORK • ATLANTA • CHICAGO • HOUSTON • LOS ANGELES

Lives and Dollars

LATE LAST MONTH the Port of New York Authority opened to traffic the new Third Tube of its Lincoln Tunnel beneath the Hudson River. At that time the company that had insured the \$100 million construction job refunded nearly 30%—or more than \$1.3 million—of the premium because of the contractors' fine safety record (see page 298).

Now \$1.3 million is not to be sneezed at, even today. Yet this refund is only the direct cash saving that safety produced. It does not take into account the indirect costs that would have been incurred had the job had its "normal" quota of accidents.

In construction, the generally accepted figure for the indirect costs of accidents is \$4.50 for each \$1 in direct costs. If this yardstick is applied to the Third Tube, the indirect cost saving is more than \$5.8 million. Add this to the direct saving and you'll see that a sound safety program put the job better than \$7 million ahead.

Unfortunately, too few contractors realize what they can gain by keeping their men—and the public—safe. And even more ignore the long-range consequences of accidents.

A case in point is a cave-in that killed six children on a state highway excavation in New York City last year (CM&E, Oct., p49). Following the disaster, the state changed its contract proposals and specifications for highway work within the city. These changes made the contractor responsible for the safety of "any person who for any reason enters the work area." They called for a 10-fold increase in minimum insurance coverage for both bodily injury and property damage. And they tightened requirements for such things as watchmen, barricades, and sheeting.

Now the state has extended these requirements to highway projects in other urban areas. Among other things, the new order calls for excavations to be completely enclosed with temporary wire fencing, and for uniformed watchmen on a 24-hour basis.

The state's engineer, however, does have some discretionary power in deciding where these provisions must be complied with. But the state admits that its construction costs will rise because of the new directive.

Well, it should not have been necessary for the directive to be issued. And it should not have been necessary for the taxpayer to expect to have to carry increased costs. We know how to build safely, and we should not have to be forced to do it by arbitrary means.

But the restrictions and directives will surely increase unless we put into practice the safety knowledge we already have. And when we do that, we will have the added advantage of lower insurance rates and lower job costs.

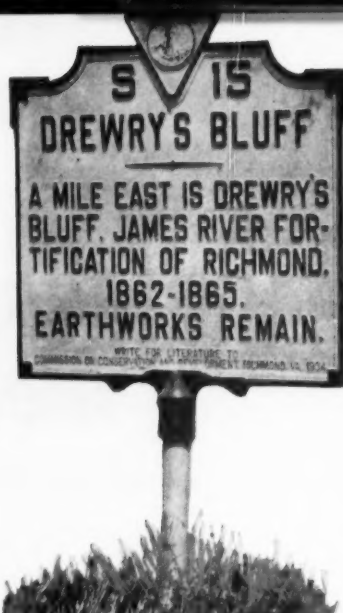
Scraper Fleets Rush Virginia Pike

VIRGINIA'S new Richmond-Petersburg Turnpike job is dramatic evidence of the revolution in earthmoving. Except for the stretch through congested Richmond, there isn't a power shovel on the job.

For nearly 30 mi, fleets of fast-moving scrapers, plus a Euclid loader spread, are moving about 80,000 yd of sandy clay every day. The ground is dry, and the four contractors handling the

bulk of the work between the two cities are rapidly regaining time lost during the wet winter and early spring.

Terrain is varied. Just south of Richmond in the flatlands along the James River, the job is virtually all borrow. Wright Contracting Co. of Columbus, Ga., has a 4-mi section that calls for 1,500,000 yd of borrow and only 350,000 yd of common excavation. All borrow material is excavated



EARTHWORKS REMAIN, says the Civil War signpost. But fleet of Caterpillar DW21 scrapers prove otherwise. Big bluff supplies borrow for turnpike contractor.





DIRT POURS from big belt of Euclid loader. Pulled by twin-engine TC12 tractor, spread loads bottom-dumps at rate of

nearly 1,000 yd per hr. Long, wide cut with more than 600,000 yd of sandy clay is ideal for belt loader operation.

from areas adjacent to the right-of-way. In most cases, native sandy clay can be handled as is, but in other areas clay and sand must be blended to assure proper compaction.

Wright is working the \$3 million job mostly with Caterpillar DW21 scrapers. Working 10 hr a day, they move about 15,000 yd.

The complete equipment fleet consists of twelve DW21's, three DW20's, two D9 pushers, one HD21 pusher, four D8 dozers, one HD20 with a sheepfoot roller, one D7, and three No. 12 graders.

The next job along the line is under the expert direction of S. J. Groves Co. of Woodbridge, N. J. Also in fairly flat terrain, it calls for 1,250,000 yd of borrow and 250,000 yd of common excavation.

Groves is handling the \$3.2 million job mostly with DW21 scrapers. Working two 10-hr shifts a day, his ten DW21's move better than 16,000 yd on an average haul of 5,000 ft.

Besides the fleet of scrapers, Groves uses one D9 and two HD20 pushers, five D8 dozers, and a variety of auxiliary equipment. For short haul work and pioneering, he employs three LeTourneau pans pulled by D8's. These big rigs are indispensable on many types of work not suited for the high-speed, rubber-tired units.

Groves' job now is running smoothly, but there were problems getting started. Equipment



DUMPED FILL is easily knocked down and spread by versatile Clark Turbodozer. Fast moving unit handles big fill area for fleet of bottom-dump wagons.



SHORT HAULS and pioneer earthmoving are ideal for old tractor-pulled LeTourneau pans. Slow-moving rigs' flexibility still give them wide application.

SCRAPER FLEETS . . . continued



SHARP TURN off right-of-way carries Euclid overhung scraper up approach ramp where it spreads fill. Fleet of ten 18-yd rigs moves 21,000 yd per 10-hr day.



COMPACTION of fill at Villa's job is achieved with Ferguson rubber-tired roller pulled by old LaPlant-Choate prime mover. Water wagons maintain proper moisture.



DIRT SPILLS over side of Caterpillar DW21 scraper as it roars away from Allis-Chalmers HD21 pusher in big borrow pit. Contractor needs 1,500,000 yd of borrow.

operators were in short supply at the beginning of the job. In fact, superintendent Harry Johnson ran a school to train scraper operators. He broke 54 cables the first week, but now the training has paid off. Production is up, maintenance is down, and cables are broken at a rate of less than one per shift.

The next job in line is a 4.5-mi stretch involving more than 1,100,000 yd of common excavation. Terrain is mostly rolling hills, and cuts and fills balance. Villa Contracting Co. of Westfield, N. J., is handling the section under a \$2.4 million contract.

Because more than 600,000 yd of excavation is concentrated in one 60-ft cut, Villa brought in a Euclid loader and a fleet of 15 Euc bottom-dump wagons. At peak production, the spread moves 1,000 yd an hr. The cut is long and wide, permitting the wagons to maneuver quickly into position.

On other cuts, Villa works three DW21 scrapers with a D9 pusher. Compaction is achieved with rubber-tired and sheepsfoot rollers.

The contractor with the longest continuous section is Blythe Bros. Co. of Charlotte, N. C. Blythe has two contracts totaling \$3.8 million and covering about 11 mi. The job requires 2,225,000 yd of common excavation, 500,000 yd of borrow, 17 bridges, and two major structures over the Appomattox River.

Like most of the other contractors on the job, Blythe employs three crawler-drawn scrap-



MOBILE General Electric light plants illuminate area during night shift.

Diesel Hammer Packs Big Wallop

ers for much of the pioneering work and for all short-haul operations.

Major excavation is handled by a fleet of ten 18-yd Euclid scrapers. Hauls range up to 4,000 ft, but the average is only 2,000 ft. Longest hauls are assigned to a pair of three-axle, twin-engine scrapers, and all others are handled by three two-axle single-engine units and five two-axle, twin-engine rigs. Working 10-hr shifts, they move 21,000 yd a day.

Where push-loading is required, a Euclid TC12 and three Allis-Chalmers HD20's do the job. Dozing is handled by one D9 and five D8's.

The last big job on the turnpike is also under the direction of Villa Contracting Co. But the terrain is better suited for scrapers than for the Euclid loader that worked so well on Villa's other job. Located south of the City of Petersburg, this job is handled primarily by a fleet of ten DW21's aided by three tractor-drawn pans. At peak production, Villa's two jobs will move a total of better than 25,000 yd a day.

Structures

Structures assume a large share of the cost of the Richmond Petersburg Turnpike. Besides two major river crossings, there are numerous railroad bridges, overpasses, underpasses, and culverts.

The vast majority of structures are supported on piles driven to rock. There are many types—prestressed concrete, thin-shell, steel H-type, and fluted wall units. The most significant feature of the piles, however, is not their design but the method of driving. Although many conventional hammers are employed, new diesel models are very popular. They pack a big wallop for their weight, eliminate considerable auxiliary equipment, and are simple to set up and operate.

A good example of top-notch diesel hammer performance is on the S. J. Groves job. Groves' subcontractor on bridges, Walter Giertsen Co., drives all its Monotube piles with a powerful Syntron hammer. Developing 30,000 ft-lb of energy, the rig drives a



BATTERED Monotube pile 50 ft long is driven fast by Syntron 30,000 ft-lb hammer operating in leads of Manitowoc crane. Hammer's speed is controlled by throttle.

50-ft pile to rock in only 3 min. It can hit up to 80 blows per min and is provided with a throttling device to control the rate of driving. Set up in the crane cab, the throttle is easily handled by the operator.

Biggest structure on the pike is the James River Bridge just south of downtown Richmond. The river portion is being built by Bowers Construction Co. of Raleigh, N.C., under a \$1.2 million contract.

The job calls for the construction of 52 round T-head piers and one abutment. Piers range from 31 to 89 ft high, and are supported on steel H-piles. They are 7 ft 9 in. in dia, with 44-ft long hammerheads.

Bowers started the job by building a work trestle from shore parallel to the bridge. From here, cranes built cofferdams,

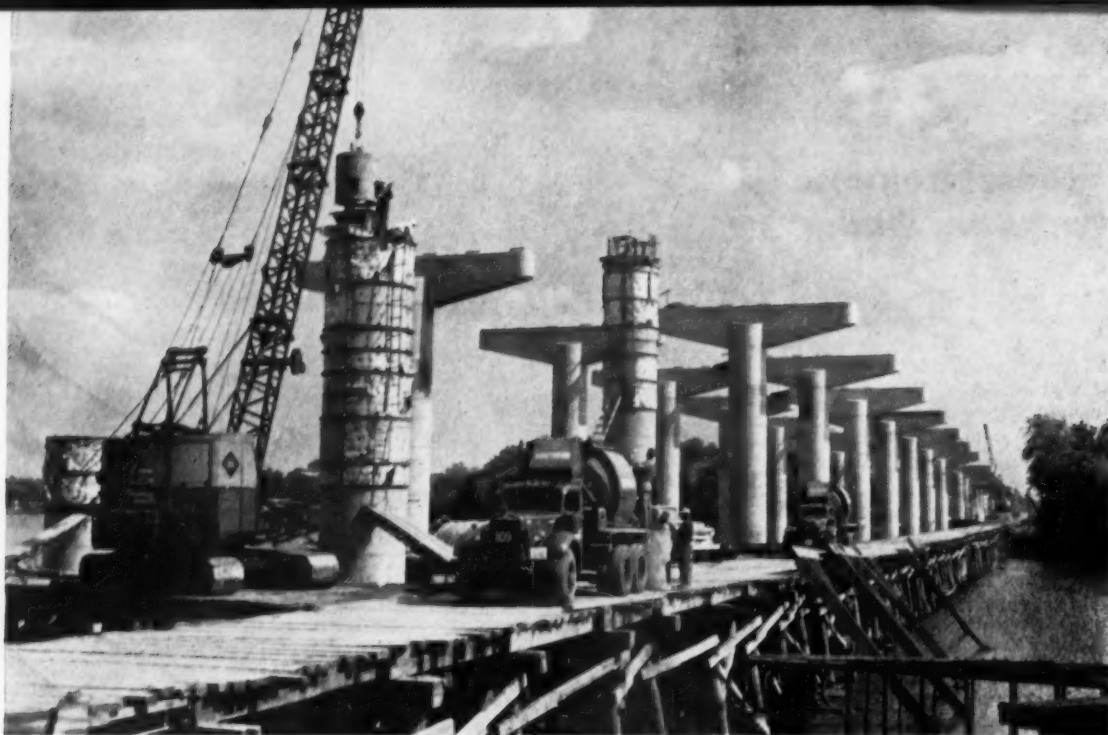
drove piles, and placed concrete.

A cofferdam was required for each pier. And because of the uniform riverbed conditions, they were all similar.

Bowers first leveled the river bed at the cofferdam area and



AIR TUGGER mounted on crane cab swings fluted wall piles into hanging leads.



CONCRETE is dumped into Blaw-Knox steel pier form at James River Bridge. Forms are easy to set up and strip and require no

guying. Contractor built work trestle along entire length of bridge with turn-outs between each pair of piers.

SCRAPER FLEETS . . .

continued

then lowered a steel frame on top. Made of two levels of steel beams 14 ft apart, the frame served as templet during sheet-pile driving and later as internal bracing of the cofferdam.

After H-piles were driven and the bottom cleaned, a tremie seal was poured. In five days, a pair of Jaeger pumps dewatered the cofferdam, and a footing was placed.

Above this point, it's a story of steel forms. Bowers purchased 180 ft of special column forms and three hammerhead forms from Blaw-Knox, and they have proven very successful. Supplied in semi-circular sections 2 and 4 ft high, the pier forms require no guying. The secret is accurate positioning of the base form panel. If this piece is set properly, all others on top can be kept plumb and on line.

Here's a typical pouring sequence. When column forms are stripped, a 2-ft lap ring is left on to support the next lift. Semi-circular form sections, stripped from an adjacent column, then are reassembled on the work trestle. They are bolted together into cylindrical sections up to 28 ft high. When completed, the sections are hoisted on top of the lap ring and bolted in place. No further bracing or shoring is nec-



T-HEAD FORM at top of pier is supported by ring form anchored to concrete. Material peeling from form is spun-glass insulation which permitted winter pouring.

essary. After three days, they are stripped.

To support the huge T-head forms, the top panel of the column form is fitted with eight anchor bolts. Held tightly to the concrete, this top section can mount the two underside truss frames that support the T-head.

To insulate the form for winter concreting, Bowers welded three-penny nails to the outside surface and placed spun glass sheets on top, held tight by washers.

Besides the obvious advantages of producing a smooth finish, the steel forms cut both set-up and stripping time and permit high-lift pours.

Other Structures

Repetition of bridge design encourages contractors on the pike to test their ingenuity developing economical forms that also offer maximum reuse. And everybody seems to have a different idea.

Walter Giertsen Co. has con-



STEEL STRAPPING is key to fast bridge column form on Gierlsen job. Bands of Acme strapping first are wrapped around assembled



form and tightened with tool. Then sleeves are clamped over ends to lock in place. It's fast and economical.

SCRAPER FLEETS . . .

continued

siderable success with a very sturdy column form tied together with Acme Steel strapping. It is simple, fast, and economical. All interior columns are rectangular, and all exterior columns have three straight sides and one curved. Both types are handled easily by Gierlsen's form.

Each of the four side panels of a rectangular form consists of $\frac{3}{4}$ -in. plywood backed by 2x6 vertical studs laid flat at 8-in. centers. Additional strength is added by 4x4 horizontal walers spaced 6 in. to 1 ft apart. On top of this, a single vertical 4x4 strongback increases the form's stiffness and helps to achieve the roughly circular wind of the strapping.

The four sides are quickly assembled on the ground by a crew of three. Two men feed the lengths of strapping under the assembled form and hand the two ends to a third man on top who inserts them in a tightening device. The strapping then is pulled tight and held that way while two sleeves are clamped over the ends. The tightening device is removed, excess strapping snipped, and the operation repeated on the next piece.

Fully assembled units are

hoisted on to the footing and guyed in place. To strip, workmen simply break the strapping with snips or hammer claw, and the panels come off easily. There are no internal tie rods. The cost is only two-thirds of conventional methods. And by turning the plywood, Gierlsen expects to get 14 reuses.

Clever column forms also are in use on the Villa and Blythe jobs. Villa's form is made with Universal panels held together by wood collars tied to the steel ribs of the panels. There are no tie rods. It strips by removing one side of the collars.

Blythe's form is more conventional, but it is easy to handle. Each side panel consists of $\frac{3}{4}$ -in. plywood backed by vertical 1x8's laid flat and reinforced with 2x6 horizontal studs. (These studs are extra long to permit reuse later in deck forms). When the sides are erected, the form is strengthened with vertical walers and with both internal and external tie rods. With proper repair, these forms can be used up to 25 times.

Personnel

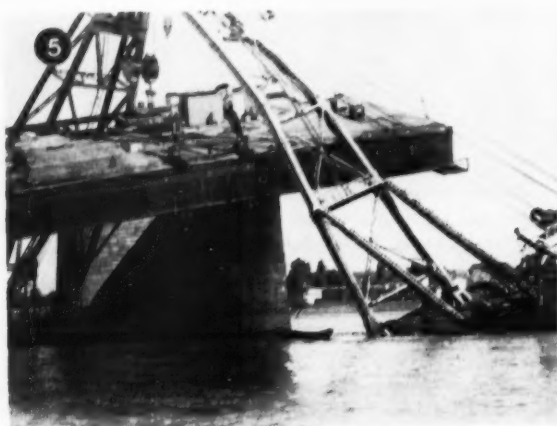
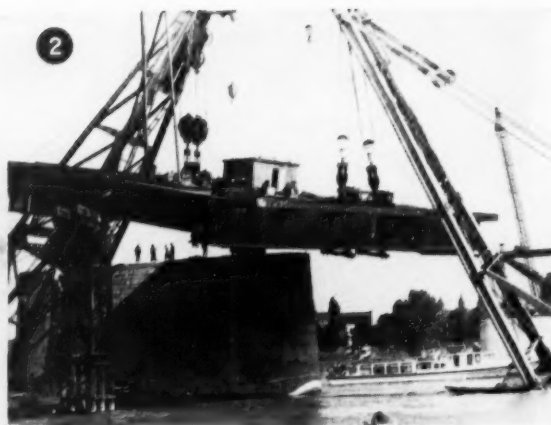
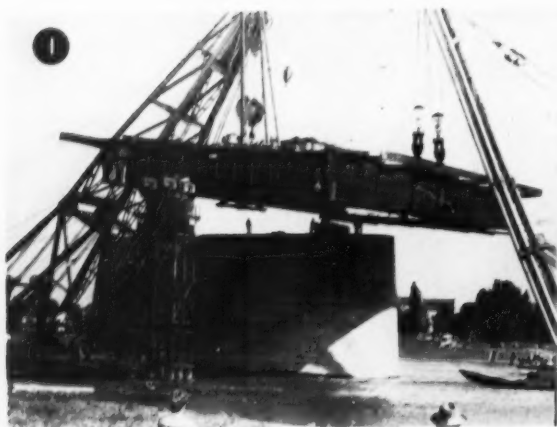
Representing the contractors are Jim Tripp for Wright Contracting Co.; Joe Vallone for S. J. Groves Co.; Joe and George Villa for Villa Contracting Co.; and Loyd Richey for Blythe Bros. Co. R. E. Leach is superintendent on

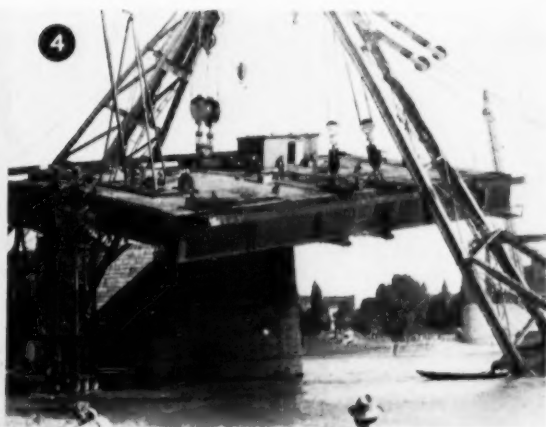


NEAT COLUMN FORM on Villa job is standard Universal panels with timber collars anchored to panels' steel ribs.

the James River Bridge for Bowers Construction Co.

Chief engineer of the Richmond-Petersburg Turnpike Authority is George D. Shropshire. Resident engineer for the consultants is Daniel R. Neff.





What Caused This Failure?

YOU'RE AN EYEWITNESS with this dramatic sequence of photos taken by a motor-driven camera. Can you figure out what must have happened?

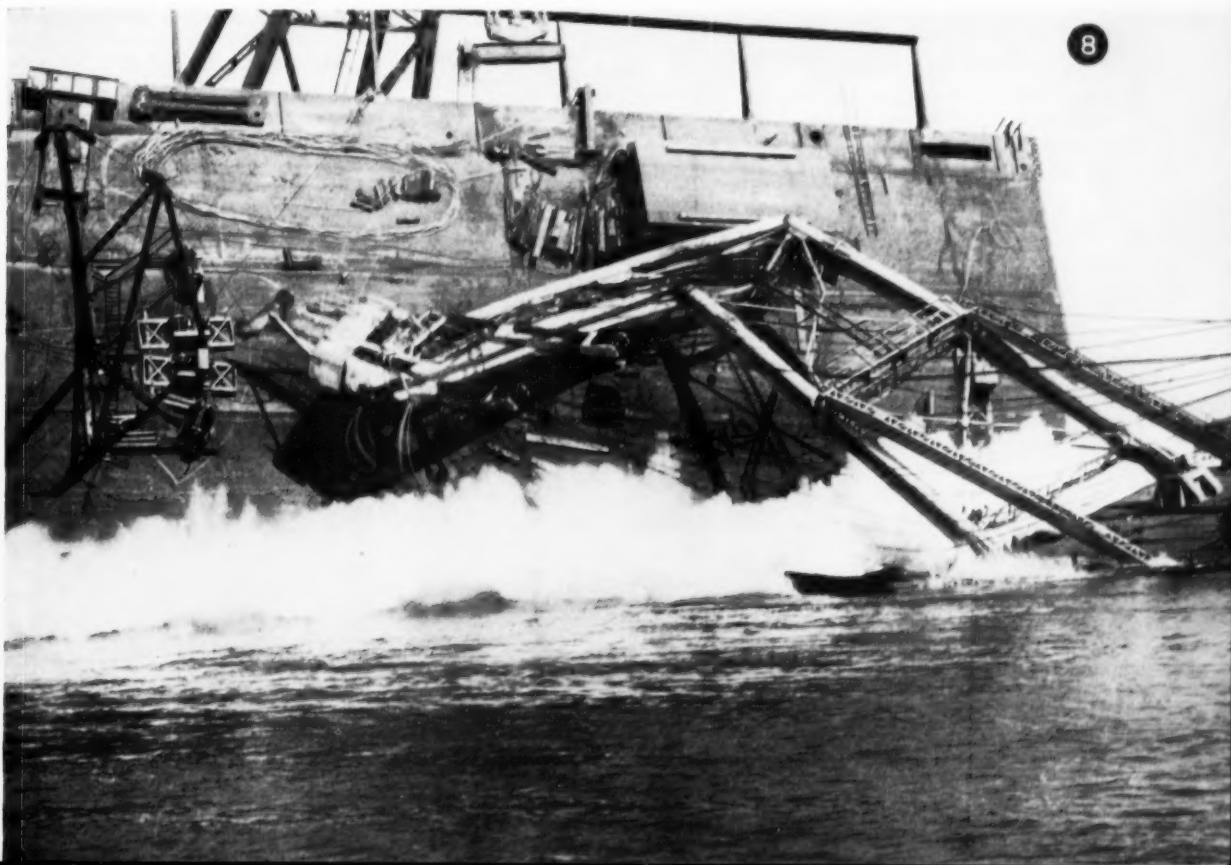
The failure took place as two floating cranes were attempting to place a 118-ft section weighing 400 tons on the main pier of a bridge across the Rhine River at Duesseldorf, Germany.

You can see the derrick barge begin to settle at one end, allowing side thrust to develop in the crane's boom. Workers on the formwork alongside the tower saw the accident coming and managed

to get out of the way. Only one worker was injured.

There's no generally accepted explanation of the failure, but there are several theories. One is that the barge had a leak below the water level that caused it to list to one side. Another is that the barge may not have been anchored securely enough against the current to make the lift on-center.

The bridge is a 1,530-ft span that will cost \$7 million. It is scheduled to be opened to traffic this fall. Principal contractors on the job are Demag of Duisburg and Neusser Eisenbau of Neuss.





PILE HAMMER in box type leads suspended from an American crane drives 4-ft dia steel pipe caissons. Airlift unit with curved

spout (right) will remove bottom material from caisson, and truck-mounted drill rig (left) will bore socket into bedrock.

Long Caissons Support Wharf

A FEW CHANGES in construction methods are making a world of difference in driving long steel pipe caissons to support a wharf at the San Francisco Naval Shipyard.

The contract for the first 16 of the 4-ft-dia caissons was delayed more than a year in completion. Some of the caissons broke or bent as they penetrated into the underlying material; and there was blowback trouble as units were unwatered for inspection or for construction of the belled supports.

But Pacific Bridge Co., holder of the second contract for caisson placement, is driving 60 of the caissons to depths as great as 135 ft at a rate of four every 10 to 12 days. The better results Pacific Bridge is getting are partly the result of careful planning by the contractor and partly due to design modifications.

Plans for the wharf support system call for bents spaced on 42-ft centers with four caissons

spaced on 14-ft centers in each bent. The caissons must go to rock bearing.

The first contract required that the caissons be unwatered and a 10-ft bell excavated in the underlying serpentine rock. For some of the caissons damaged in driving, this base detail was modified to permit two 18-in. holes to be drilled into the rock. These holes were cased to facilitate entry of the drill but had to be excavated at least 16 ft below the bottom of the casing.

For the Pacific Bridge contract, the design was modified to give the contractor the option of drilling a full diameter (4 ft) hole through the caisson into the rock and filling the socket and caisson with tremie concrete. Pacific Bridge adopted this option.

In addition, Pacific Bridge elected to thicken the bottom 3 ft of the caisson from the $\frac{3}{4}$ in. specified to 1½ in. The edge of the heavier steel is beveled to provide a cutting edge that facili-

tates driving the shell through firm clay and rock.

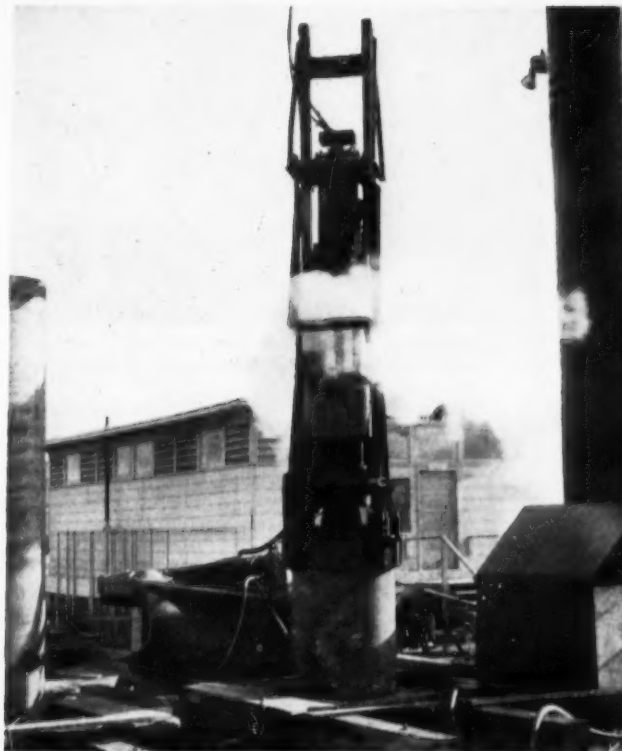
Pacific Bridge also places the cans in sections rather than as complete units. This permits driving until nominal resistance is encountered. Then the hammer and its leads are removed, and an airlift dredges out material within the shell. The con-



BOTTOM of caisson is a 3-ft length of 1½-in. steel with a beveled cutting edge.



WELDER makes joint between caisson sections. In-place assembly facilitates handling as well as airlift removal of material.



DRIVING ANVIL of pile hammer is equipped with springs that reduce the rigidity of the assembly and prevent bolt failure.

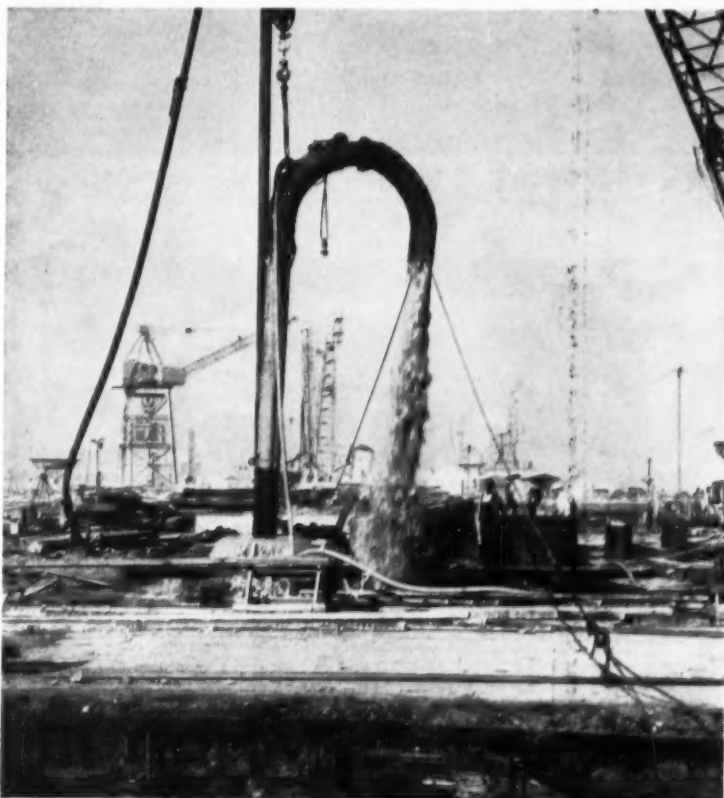
tractor leaves at least 20 ft of material inside the shell to prevent blowback troubles.

Initial caisson sections vary in length from 24 to 63 ft. Pacific Bridge selects the length to make sure the can will be driven well into the bottom material. Timber walers attached to the existing wood wharf hold these initial sections in alignment.

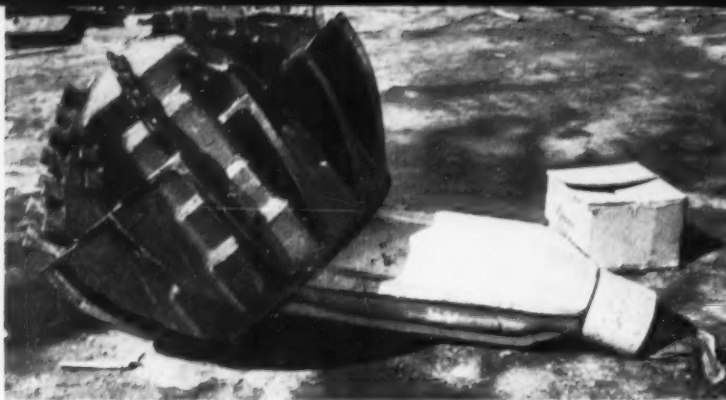
A 30,000-ft-lb Vulcan O-R hammer mounted in box type leads drives the steel shells. The driving head fits into the top of the steel shell, and springs mounted on the head reduce the rigidity of the assembly to prevent bolt failure.

As the shells penetrate into the bottom, additional sections as much as 30 ft long are welded on. Full penetration welding, from the outside only, makes the joint. The additional sections are held in place by brackets welded on the outside of the shell, and milled ends assure alignment.

When a shell encounters nominal resistance, driving is halted and the airlift goes into action. The airlift consists of a 14-in.-dia flanged pipe served by a 2-in. pipe that delivers air at 100 psi to a manifold about 1 ft from the bottom of the assembly. A 6-in.



AIRLIFT assembly consists of a 14-in. dia flanged pipe and a 2-in. pipe that delivers air at 100 psi to a manifold. A 6-in. water jet helps loosen bottom material.



SWIVEL-MOUNTED BIT drills socket into rock below caisson level. Water jet through drill stem and bit keeps drilled rock particles in motion, removes some fine material.



TRUCK-MOUNTED DRILL RIG is a "Joe McGee" assembly patterned after drills used in oil field operations. Depth of drilled socket varies from 9 ft to as much as 17 ft.



TREMIE BUCKET, designed by the contractor, is 12 ft long and 3 ft in dia. A pair of air rams open the gate to dump concrete. Rubber-encased springs close the gate.

LONG CAISSONS . . . continued

water jet helps loosen the material and prevents the water level in the can from being drawn down too far.

When the caisson tip reaches

required elevation, material above rock level is pumped out by airlift, but the shell is not unwatered. Then a truck-mounted rotary drill rig with a 44 $\frac{3}{4}$ -in.-

dia Zublin bit mounted on a swivel joint is inserted to drill the socket into the rock. A water jet through the drill stem and bit keeps drilled rock particles in motion and removes some of the finer material.

Bidding was based on drilling 12 ft into the rock, but depth varies with the nature of the material. In the better material, depth of the drilled socket is as little as 9 ft. In the most extreme case, the drilled holes went 17 ft below the steel shell. Drilling rates and inspection of the wash tailings help determine how deep the socket should be to provide proper support.

Pacific Bridge Co. designed a 2 $\frac{1}{2}$ -yd tremie concrete bucket to concrete the sockets. The bucket is 12 ft long and 3 ft in dia. A pair of air rams operate the gate after the bucket reaches proper depth. When air to the rams is released, rubber-encased springs close the gate.

The bucket goes down into the shell until it hits the previously poured concrete as shown by cable spin. Marks on the cable serve as a check on bucket elevation.

Over much of the work area, a layer of firm clay lies on top of the serpentine rock. Penetration through the clay into the rock provides adequate lateral strength. But where there is no clay layer, a cage of reinforcing steel must be placed in the socket, extending at least 4 ft up into the shell.

Where reinforcing cages are necessary, a tremie pipe places the initial concrete. The contractor feeds a rubber ball down the pipe first to prevent mixing concrete and water. Concrete in the shells is a 7 $\frac{1}{4}$ -sack mix that develops 3,500 psi in 28 days.

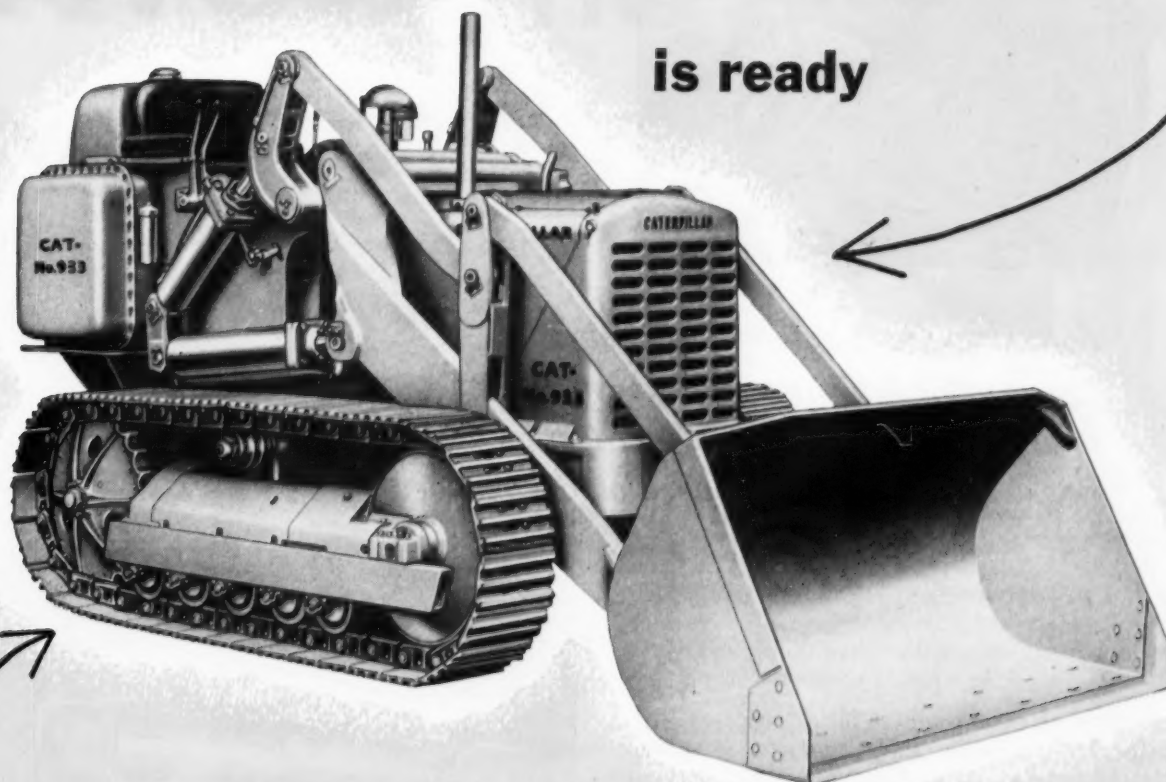
Progress on the Pacific Bridge contract has been good. Once the job was well under way, the contractor finished a complete four-caisson bent, including the deck system, every 10 to 12 days.

The job is a project of the Navy's Bureau of Yards & Docks. Capt. J. A. McHenry, Public Works Officer, Twelfth Naval District, is officer in charge of construction. Capt. J. T. Riordan, public works officer of the shipyard, is resident officer in charge of construction. His assistant is Glenn H. Rogers.

For Pacific Bridge Co., Al Cantor is project superintendent, and Jan Cipar is project engineer.

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	No. 977	No. 955	New No. 933 (Series E)
Flywheel HP at sea level	100	70	50
Bucket capacity, cu. yd.	2½	1½	1
Bucket tip-back at ground level	40°	40°	40°
Bucket tip-back at maximum lift	46½°	47½°	48°
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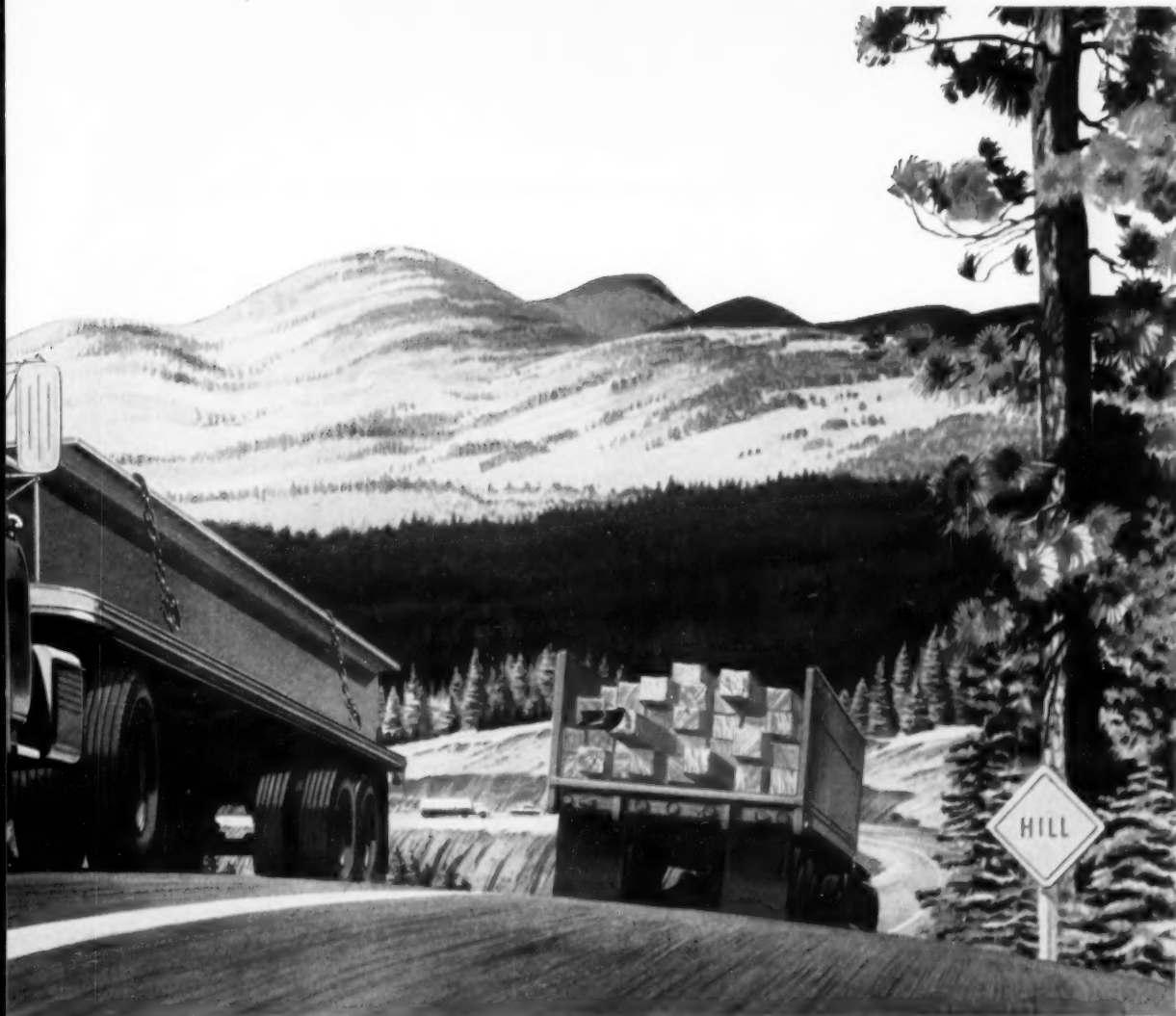
Sure control! The retarder acts as built-in brake; saves service brakes!



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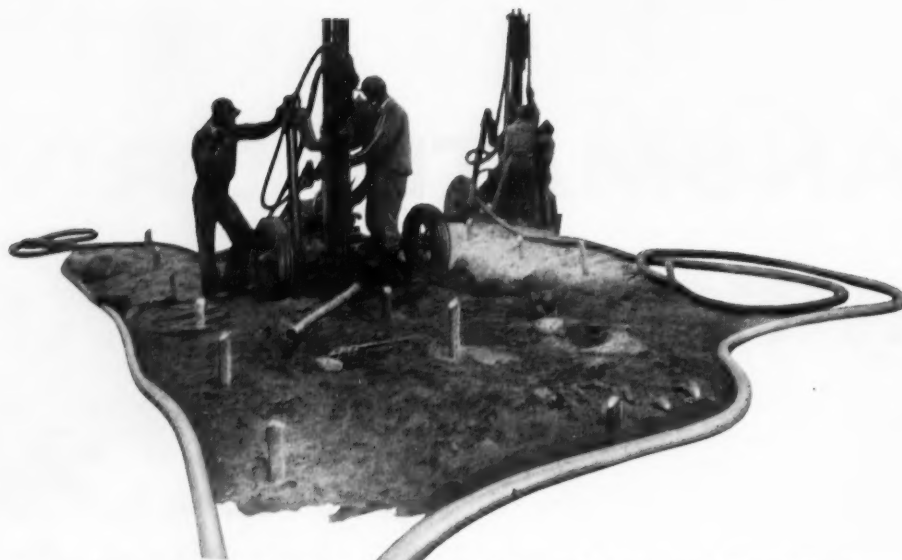
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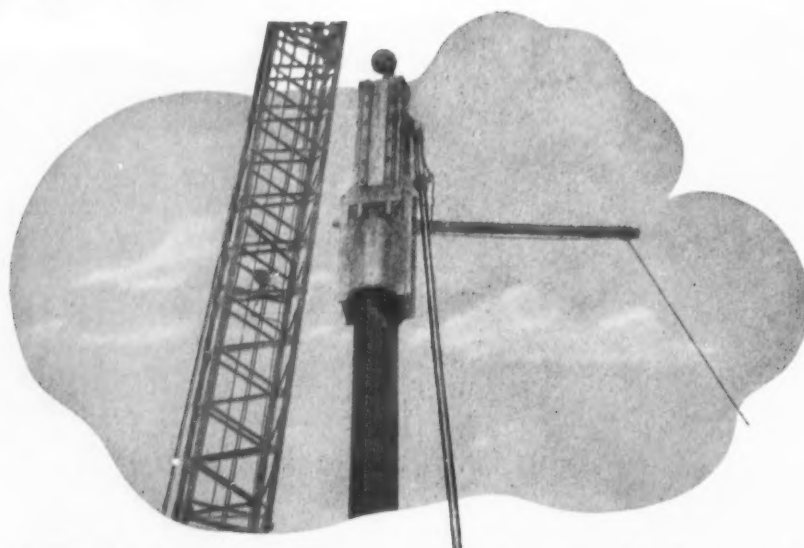
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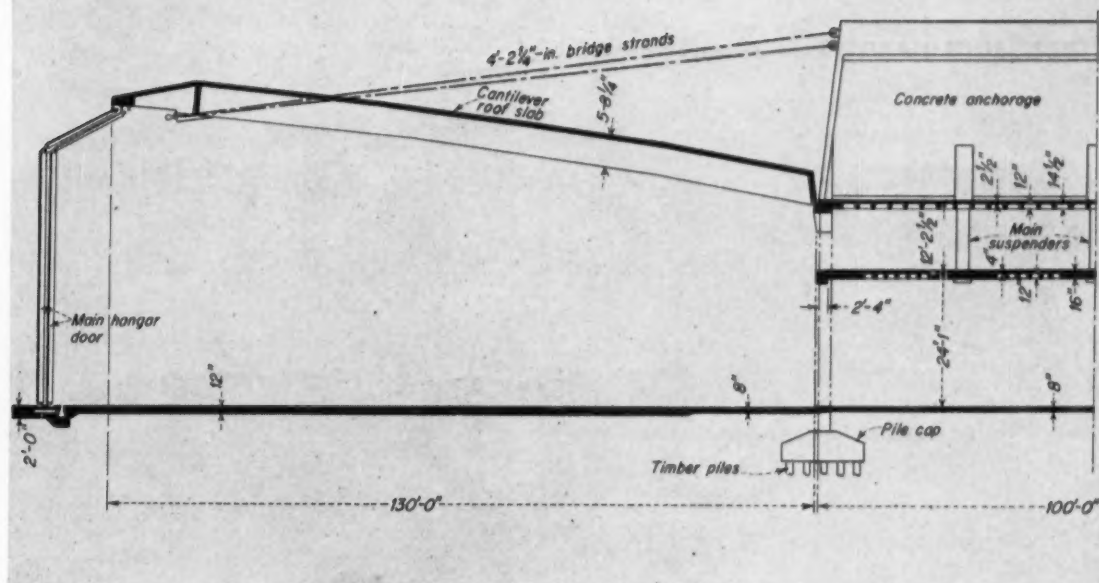


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TEST CONTRACTOR INGENUITY—Corbetta Construction Co. had to reach to the moon for the new methods it will use to form the

corrugated concrete roofs of this suspended roof hangar now under construction at New York's International Airport.

Suspended-Roof Hangars— How Do You Build Them?

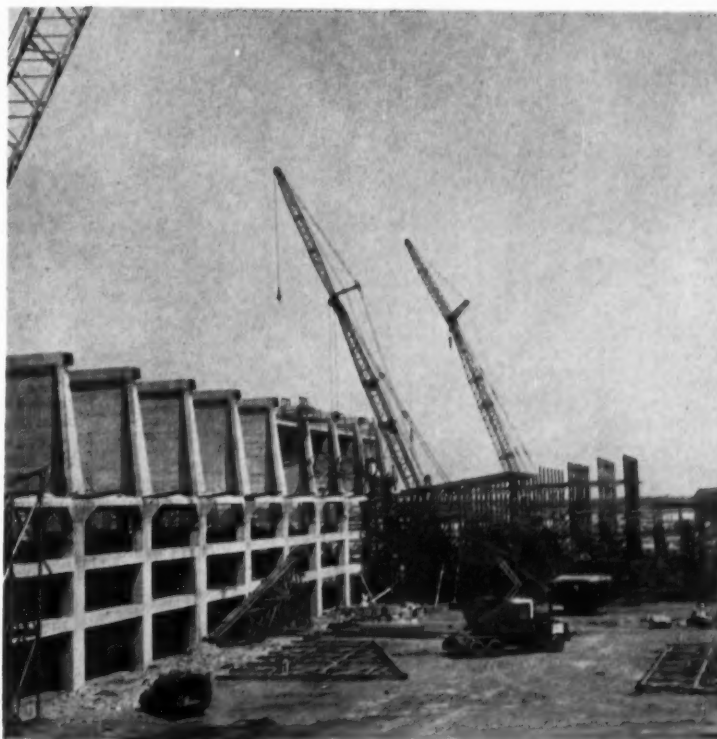
SUSPENDED, corrugated roofs now becoming popular with airplane hangar designers really put contractor ingenuity to severe tests. There just seems to be no way to form for these roofs without resorting to some highly unusual technique.

Corbetta Construction Co. of New York will employ three of the most unusual you're apt to see in a long time on a hangar at New York's International Airport for Pan American World Airlines.

- Piggy-back form travelers will support roof slab forms.
- Canal paving machines will screed roof slab concrete.
- Bootstrap jacking will tension roof cables and simultaneously free slab forms.

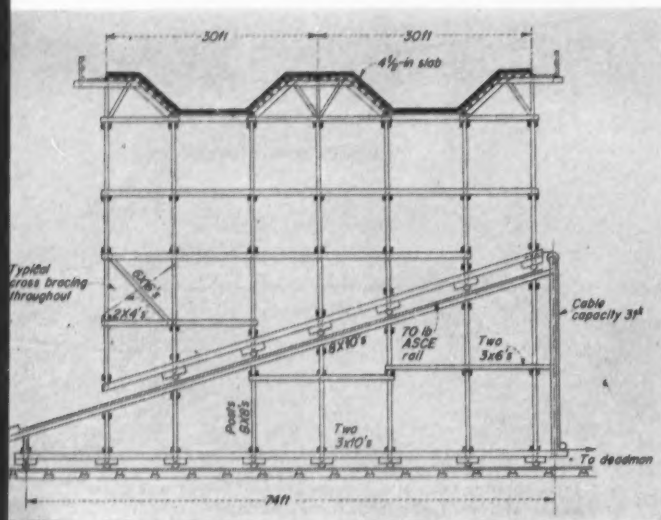
The hangar is one of four buildings in Pan American's new \$12-million operations center at the field. Others are a three-story concrete office building and two smaller one-story wing buildings. But the show-stopper is the hangar.

It is divided into two parts: an anchor building that serves as a bent; and two cantilevered, corrugated concrete roof slabs that

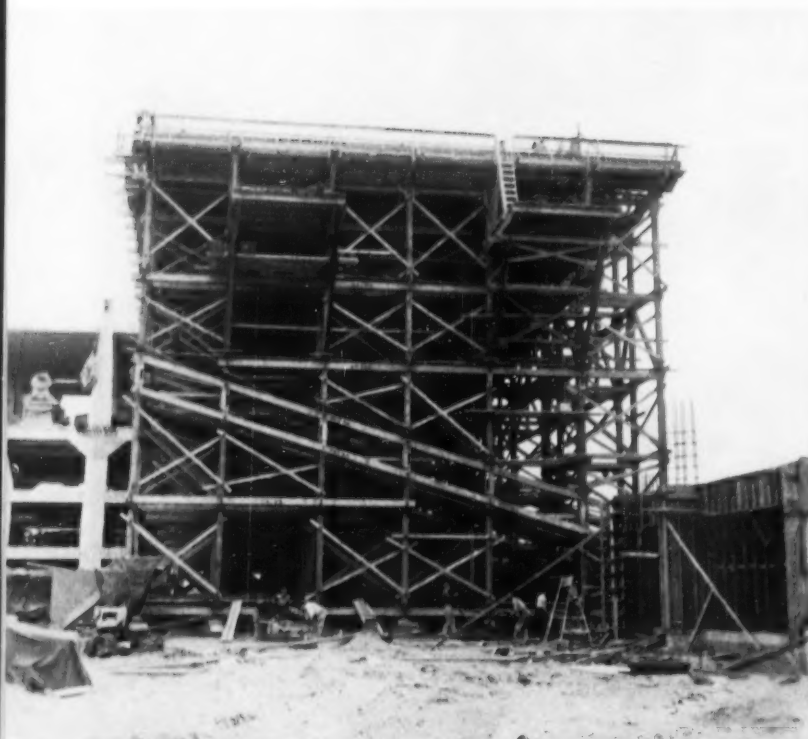


ASSEMBLE TRAVELER—Once three-story concrete anchor building (left) was completed, work began on assembly of first of four unusual travelers that will support slab forms.

SUSPENDED-ROOF HANGERS ... continued



Piggy-Back Traveler Marks New Approach To Form Supports



AWAITING THE BIG DAY—Completed traveler set in pour position with forms in place awaits the start of concreting. Bottom wedge will pull out so top wedges drop vertically.

are suspended by cables from each side of the bent.

The anchor building is a simple 100x600-ft concrete structure three-stories high that rests on two parallel sets of timber piles capped with concrete. Concrete columns rise from the caps to support concrete spandrels and grid-type floor slabs at each story.

Spaced on 30-ft centers across the length of the roof of the anchor building are 30-ft-high concrete walls 100 ft. long. These walls will anchor the cables that will suspend the two 135x600-ft corrugated roof slabs.

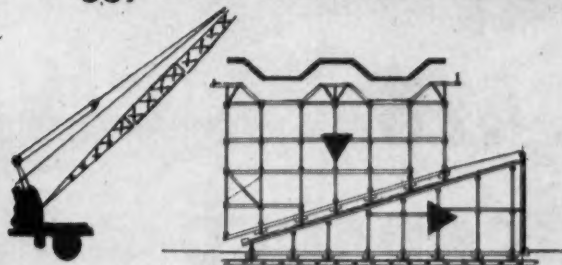
The roof slabs—cause of all the problems — will be only 4½ in. thick. But they will have parallel corrugations 6 ft deep and 30 ft wide that will run perpendicular to the anchor building. In addition, roofs rise from 36½ ft above ground at the anchor building to 53½ ft at the outboard edge.

"In planning the job," said Donald MacLeay, Corbetta's job engineer, "our first problem was to find a way to form the roof slab so that we could strip and reset the forms. We had to reach to the moon for the method."

Corbetta's men knew that building a rigid form would require so much falsework that material and labor costs would be astronomical. The job demanded a traveler.

"But," said MacLeay, "what

Piggy-Back Traveler



TO STRIP SLAB — Bottom wedge of traveler is pulled out. This causes the top wedge to drop vertically, clearing forms from corrugations.



JIGS SPEED ASSEMBLY—Truss members for traveler are precut to size then are set over jig where workmen make bolted connections.

kind of traveler do you build that can be lowered enough for forms to clear the corrugations during stripping, yet can be moved and reassembled quickly for the next pour?"

MacLeay answered his own question. "We dreamed up this piggy-back traveler."

When fully erected, the traveler will measure 135 ft wide, 163 ft long, and will stand three stories high. It will consist of two timber right angle wedges placed over one another so that the thick portion of the top wedge will ride over the thin portion of the bottom wedge in piggy-back fashion.

Simply pulling one wedge out from under the other will cause the upper wedge to drop down vertically far enough to free forms from under the slab and clear the corrugations. Pulling the top wedge up to its original position will reset the traveler for the next pour.

Two travelers now are being assembled at the job. Each wedge is made up of a series of timber trusses connected by cross braces. Wheel and jack assemblies on each will anchor the wedges during a pour or permit moving them to the next pour site.

Truss members for the wedges—principally 8x8's—were precut at the job site to proper size. Workmen assembled precut sections in jigs on the ground, bolted

the connections, and lifted each completed truss by crane.

Every other truss was fitted at the bottom of its upright posts with wheel assemblies. Upright posts of the remaining trusses extend down to 6 in. below the bottom of the truss foot.

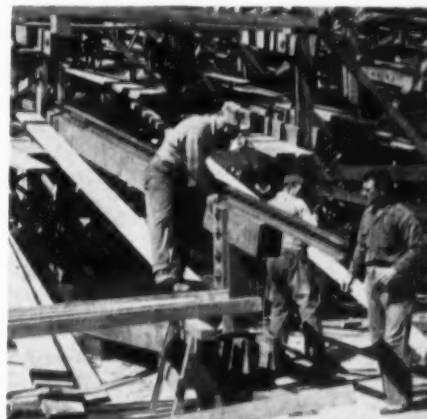
Trusses for the top wedge of the traveler were built in the same way with the same number of trusses having wheel assemblies and the same number without wheels.

A crane lifted the trusses into position over a set of rails and held them upright until workmen could place cross bracing.

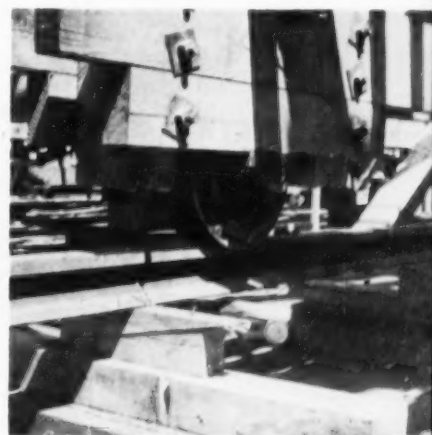
Four rails next were run up the slanted side of the bottom wedge on which the top wedge will ride. Near the foot of each rail workmen welded a curved plate to arrest the upper wedge during the stripping operation.

Finally, the bottom wedge was jacked up until its wheels cleared the tracks, and wood shims jammed under the extended posts and hammered home.

A crane lifted truss members for the upper wedge into position in the same way. Jacks set on the bottom wedge will hold the wheel-bearing trusses clear of the rails. When both top and bottom wedges are braced, jacked, and securely positioned, forms will be placed over the traveler.



RAILS DIVIDE WEDGES—Top wedge rides on rails set over top part of bottom wedge.



RIDES ON WHEELS—Bottom wedge is fitted with wheels that ride on rails.

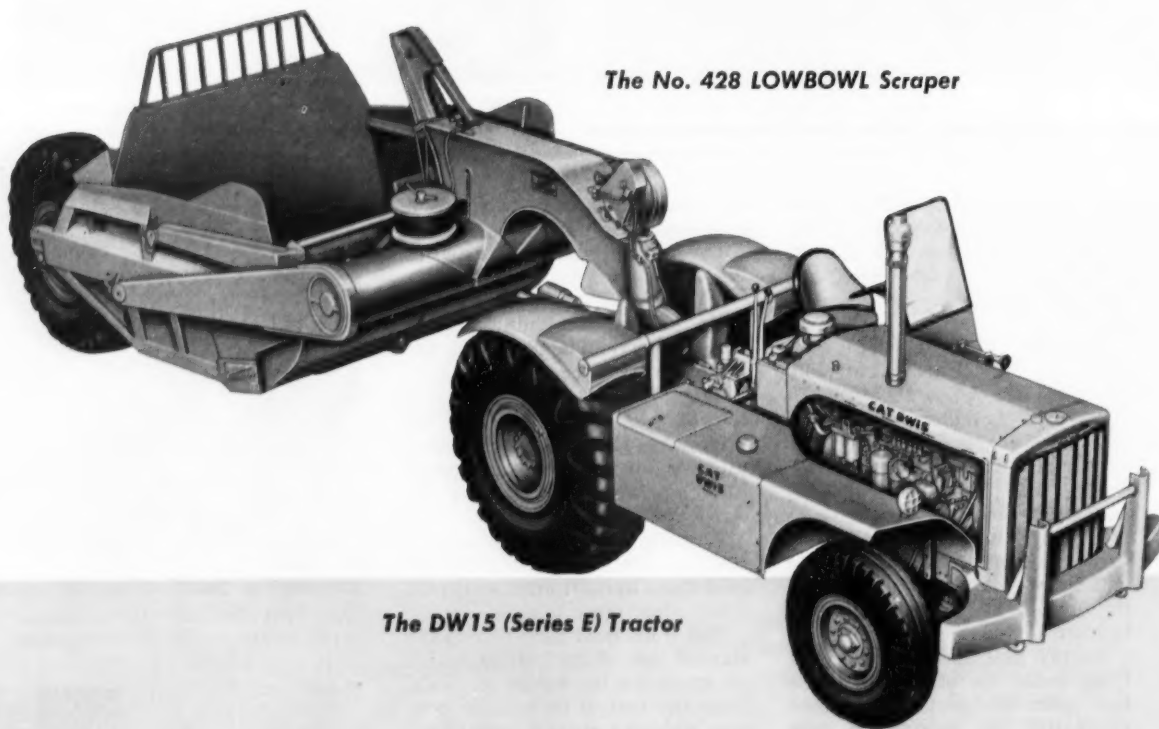
continued on page 112

CATERPILLAR ANNOUNCES

NEW DW15 (SERIES E)

AND NEW No. 428

LOWBOWL SCRAPER



The No. 428 LOWBOWL Scraper

The DW15 (Series E) Tractor

Here's a new Cat team loaded with features that add up to one thing—**A HIGHER PRODUCTION RETURN ON YOUR INVESTMENT.** See your Caterpillar Dealer for details on this great team's performance.

GET THE STORY IN BRIEF ON THE OPPOSITE PAGE ►

A GREAT TEAM: The performance of the DW15 (Series E) Tractor and No. 428 Scraper can be summed up simply: **bigger loads—faster.**



FACTS ABOUT THE DW15 (SERIES E) TRACTOR

Around the world, the DW15 has proved that it can move material faster and more profitably than competitive machines in its class. Now there's a new DW15 (Series E) to give you even higher production. This is the story:

ENGINE: A new Caterpillar D326 Engine, designed especially for the DW15 (Series E), develops 200 HP (maximum output capacity).

And Caterpillar research has produced a 23% torque rise in this new engine! This means that high tractor rimpull is maintained through a wide range of travel speeds in each gear, and the need for gear changing is decreased. In fourth gear, for example, over 3,000 pounds of rimpull are delivered at travel speeds from 9 MPH all the way to 18 MPH. A new engine, yes—but with these traditional Caterpillar advantages: uses inexpensive No. 2 furnace oil without fouling; needs no fuel system adjustments; requires no cleaning of fuel injection valves.

TRAVEL SPEED: The DW15 (Series E) offers ten speed selections, from 2.7 to 37.2 MPH. But, more important, it provides four-wheeled sure-footedness—the ability to use the speed on the job. Operators ride with more comfort, feel greater stability. They travel faster, and in safety.

MANEUVERABILITY: Four-wheeled stability means faster cycle time because the DW15 (Series E) can make short radius turns at higher speeds. It can turn without stopping inside a 35-foot diameter and in a smaller area through use of a turn-back-turn maneuver.

VERSATILITY: The DW15 (Series E) provides versatility that far surpasses similar sized two-wheeled machines. It can be unhitched from its scraper and

used as an independent unit to tow compactors, water wagons or other units, and it can be teamed with the Athey PR15 Wagon for rock hauling work.

FACTS ABOUT THE No. 428 LOWBOWL SCRAPER

CAPACITY: Struck—13 cu. yd.; heaped—18 cu. yd.

ADVANCED DESIGN: There is more to Caterpillar's exclusive LOWBOWL design than a low bowl profile. Width and length proportions are designed to give maximum loading efficiency. And every component—particularly the apron, ejector, cutting edge—is likewise designed to do its part in achieving capacity loads.

LOADABILITY: The final result of this careful engineering is this: bigger loads—faster. LOWBOWL design gives the new Caterpillar No. 428 Scraper a faster loading rate because incoming material meets less material resistance and less friction from the load already in the bowl. While other scrapers are still in the cut struggling for the last few yards of their load, the new Cat units are on their way to the fill—with big pay loads!

NEW FEATURES: Outstanding new features of the No. 428 include: increased ground clearance—for high-speed travel in rough going; increased apron lift—for faster ejection of any material; large area pushblock—for better pusher contact.

NEW TIRES FOR THE DW15-No. 428

Both the CAT* DW15 (Series E) Tractor and No. 428 Scraper feature 26.5-25 wide-section tubeless tires—the product of extensive co-operative research by Caterpillar Tractor Co. and leading tire manufacturers. Tubeless tires offer load-carrying capacity comparable to conventional tires at a reduced inflation pressure. This gives better flotation and traction while decreasing rolling resistance. The wider tire treads take a "grouser like" bite, making more efficient use of engine horsepower. And tubeless tires eliminate 80% of the down time caused by tire failure.

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

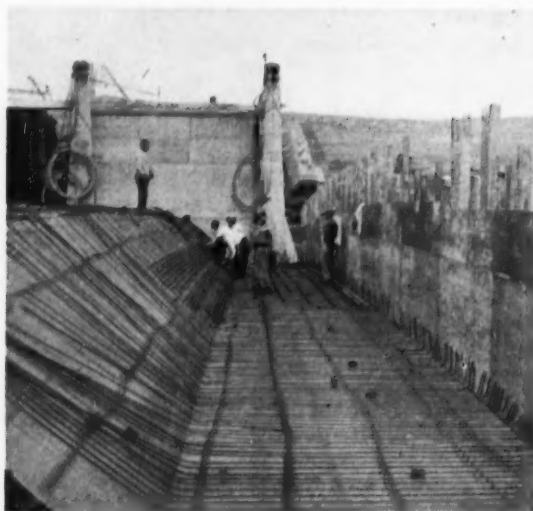
CATERPILLAR*

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ONE GOAL: To concentrate our capabilities, resources and experience on the design, manufacture, distribution and service of job-tested heavy equipment.



PREFAB ROOF FORMS—Forms are fabricated to shape of roof corrugations on site. A crane lifts them into place over traveler.



REINFORCING—Workmen place steel over forms prior to concreting. Cables shown in background will suspend roof.

Baby Canal Paver Will Place Concrete For The Roof Slab

Prefabricate Roof Forms

The contractor prefabricates forms for the corrugated slab on the ground. These are made of $\frac{5}{8}$ -in. plastic-coated plywood braced by 2x4's and 4x4's. Each form is 135 ft in length and 30 ft in overall width. Two lengths of forms placed side by side over the traveler will constitute a single bay.



FINISHER AWAITS WORKOUT—Small version of huge machine used to pave and screed concrete on irrigation canals was made by Heltzel Form and Iron Co. to pave roof concrete.



VIBRATING—Electrical impact vibrators placed in paver blade help strike off concrete at proper slab thickness.

After the forms are positioned, workmen place reinforcing rods, conduit, fixtures, and inserts through which anchor cables will pass.

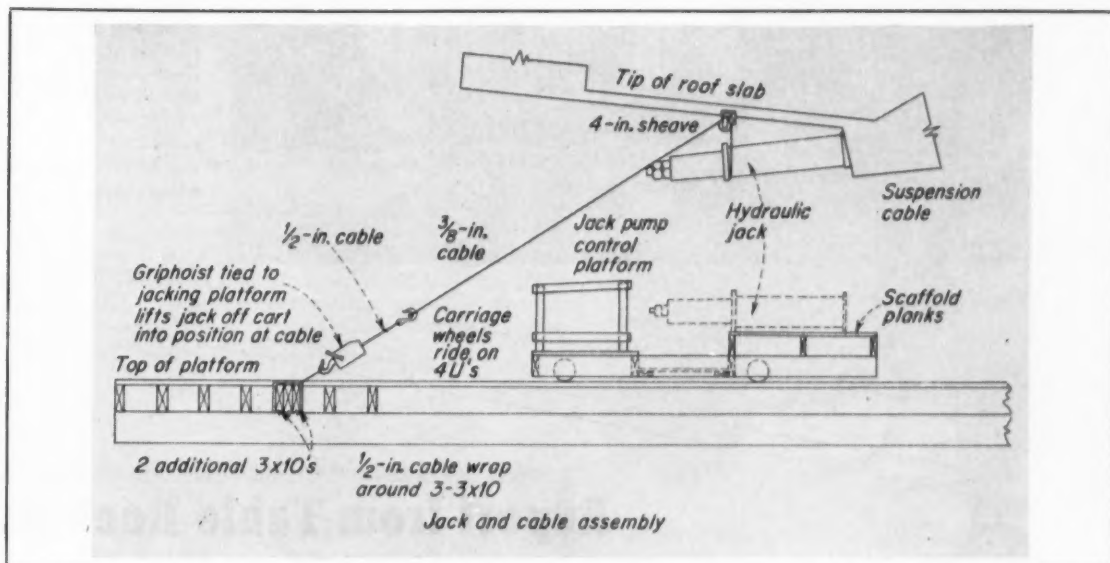
Modified Canal Paver Will Screed Roof Concrete

The contractor anticipated two serious concreting problems to spring from the sloping sides of the corrugations and from the upward lift of the slab. They were: (1) how to keep concrete from slipping down the sloped sides; (2) how to keep concrete from puddling at the low point where the slab joins the anchor building.

"Corrugations on the slab look a heck of a lot like irrigation canals," said MacLeay. "We figured irrigation canals must have created similar concreting problems. So, we reasoned, why not use the same kind of screed on the roof that's used in the canals?"

Corbetta commissioned Heltzel Steel Form and Iron Co. to make up a light weight canal paver with a blade that would fit the dimensions of the roof corrugations. Heltzel came up with a beauty. It will ride on rails set on wood chocks on top of the forms.

This is how it will work. Concrete will be lifted in buckets by crane to the roof and deposited into a hopper on the roof form. Workmen then will buggy the concrete to the machine's hopper.



BOOTSTRAP JACKING—To stress cables and simultaneously lift roof slabs free of forms, Corbetta employs this simple set up. It

consists of a platform built into the traveler that will support a movable cradle and winch device for setting jacks.

There concrete will flow down a series of vertical steel baffles on the leading edge of the machine. These baffles are expected to support the concrete along the slopes while electric impact vibrators attached to the insides of the machine's blade vibrate the concrete. Movement of the blade will strike off the concrete at its proper thickness.

"Of course," said MacLeay, "using a really stiff mix will help a lot."

Lelite concrete with a strength of 3,500 psi will be used. The mix will contain 6 1/4 gal of water for each bag of cement to produce concrete with a 2 to 3-in. slump.

Once a section of slab is completed, a crane will lift the machine off the rails and carry it over to a new set of rails. Rails for the first pour then will be removed along with their supporting chocks. Indentations left in the concrete will be pointed up.

Bootstrap Jacking Will Stress Cables

Concrete will cure seven days before the traveler will be put to work stripping forms. But first, the roof will have to be suspended by cables from the anchor walls. Fortunately, this operation will prove beneficial to the traveler operation.

Corbetta's forces dreamed up a method of suspending the cables with jacks that will literally lift the slab by its own bootstraps.

A jack will go up against the underside of the slab and grasp the cable. Then, using the underside of the slab as reaction, the jack will exert a pull on the cable to raise the end of the slab 2 in. and free the forms.

For the jacking operation, Corbetta is building a timber platform inside the upper traveler wedge near its top. A small wood

cart will serve as a jack cradle. This will be placed on rails set on the platform.

A cable then will be run around the jack, up through a 4-in. sheave secured to the underside of the slab, then down to a small grip hoist attached to the rear of the jacking platform. By operating the grip hoist, workmen will lift the jack from its cradle.

continued on page 118



PLATFORM RIDES WITH TRAVELER—Cart, jacks, and winch will remain in place during movement of traveler after stripping. Platform is made of wood and set under slab.



About 3 million cubic yards of dirt will be moved in construction of Table Rock Dam southwest of Springfield, Missouri. Power pool will cover 43,100 acres. Project is joint venture of Morrison-Knudsen and Utah Construction. Estimated completion date: 1958.

Report from Table Rock Dam

*Morrison-Knudsen Co., Inc., and
Utah Construction use one
grease for all purposes*

AMOCO* Lithium Multi-Purpose Grease helps contractors meet manufacturer's recommendations for lubrication yet reduces grease inventories.

On the Table Rock Dam project the problem was how to lubricate more than 16 different *types* of equipment and still follow equipment manufacturer's recommendations without carrying a big inventory of greases. The answer to the problem was found in Amoco Lithium Multi-Purpose Grease. Here's the case history:

Morrison-Knudsen and Utah Construction lubrication and maintenance men, working with Standard Oil automotive lubrication specialists, made a complete lubrication survey. They studied each piece of equipment, the points to be lubricated and the manufacturer's lubrication recommendations. Amoco Lithium Multi-Purpose Grease proved to be the ideal lubricant for the job in every instance where it was recommended and used.

Bucket on the way! Harold Maxwell, Superintendent of Morrison-Knudsen Company, and Bob Buel watch eight-yard bucket of concrete pass overhead on way to forms. Standard management realizes importance of lubrication on construction projects, backs up lube sales with top-rated technical service.



Amoco Lithium Multi-Purpose Grease was adopted for all equipment. Morrison-Knudsen and Utah Construction have realized substantial savings. A smaller grease inventory reduced investment in supplies and cut record keeping. Dispensing and handling equipment now used is much less than what was formerly required. Application time is reduced to a minimum. Misapplication errors and resultant bearing failures are virtually eliminated.

Your lubrication problems can be licked in just the same way Morrison-Knudsen and Utah Construction have done it at Table Rock Dam. No matter where your job may be, in any of the 15 Midwest and Rocky Mountain states, there is a Standard Oil automotive lubrication specialist nearby. Call him. Or write Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.

Quick facts about

AMOCO* Lithium Multi-Purpose Grease

- Suitable for chassis, wheel bearing, water pump, universal joint, gear case, track roller and other grease lubrication.
- Pumpable at all temperatures. Easy to apply.
- Lubricates effectively in all weather. Soft grade available for extremely low temperature service.
- No bearing wash out even in severe service.
- Does not oxidize or cake in bearings.
- Mechanically stable. Will not thin in use.
- Stable in storage. Maintains uniform consistency.

*Trade mark Amoco registered U. S. Patent Office by The American Oil Company and used by Standard Oil Company under license.



Standard's Bob Buel (left) checks lubrication data with Jerald Maxwell, lube foreman with Morrison-Knudsen. Bob is qualified to assist customers with lubrication problems. He has been doing this work for more than four years. He's a graduate of Missouri School of Mines with a B.S. degree and has completed the Standard Oil Sales Engineering School. Customers find Bob's experience on the job and special training pay off for them.



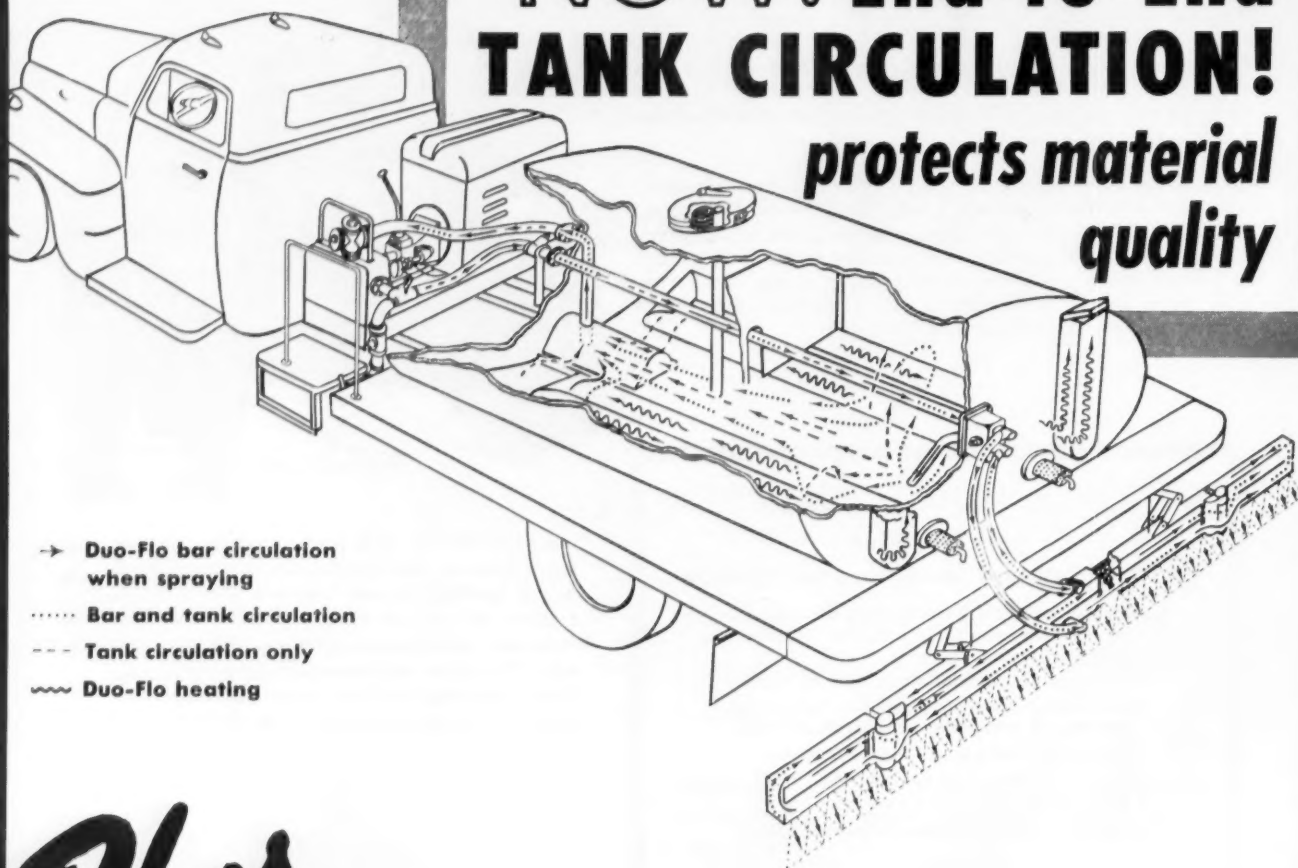
STANDARD OIL COMPANY (Indiana)



Standard's Bob Buel checks conveyor belt used to move 450 tons of crushed rock per hour more than a mile. Bearings on conveyor are lubricated with AMOCO Lithium Multi-Purpose Grease.

NOW! End-to-End TANK CIRCULATION!

*protects material
quality*



- Duo-Flo bar circulation when spraying
- Bar and tank circulation
- Tank circulation only
- ~~~~ Duo-Flo heating

Plus

**greatest operating simplicity and safety
ever built into a bituminous distributor**



Now you can get a bituminous distributor that *positively circulates material in the tank* for faster, more uniform heating. This new Seaman-Gunnison system eliminates local hot spots; there is less evaporation of solvents; less burning of bitumen residue and consequent less coking and nozzle clogging.

And, gone is the maze of rear-end piping! . . . eliminated by Seaman-Gunnison front-end pumping and control. Air-operated nozzles open or close in a *split-second*, while the Duo-Flo bar assures precise, uniform nozzle pressure and material application.

Write for free descriptive Bulletin No. 8, giving complete information. Use coupon on next page . . . Write today!

Safety front-end control

gives the operator a grandstand view of the spray bar, safely away from hazardous smoke and fumes. Cab control for complete one-man operation is optional.

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production,
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**SEAMAN
GUNNISON**

**After 800,000 cu. yd.
compaction experience,
Kramp Construction Company
buys another DUO-PACTOR**

Based on an estimated saving of 50 per cent in compacting 16,000 cu yd daily with three Duo-Pactors, this prominent Milwaukee, Wis. contractor has bought another Duo-Pactor to start the 1957 season.



**Contractors prove
DUO-PACTORS obtain
specified densities
at LOWER COSTS!**

Now, you can do ALL types of compaction with a single unit . . . the new Seaman-Gunnison DUO-PACTOR! Moreover, you can *save 50 per cent or more* in cost of compaction equipment. You easily meet compaction specifications. You slash operating costs. You save time with Duo-Pactor self propelled, self-transporting mobility.

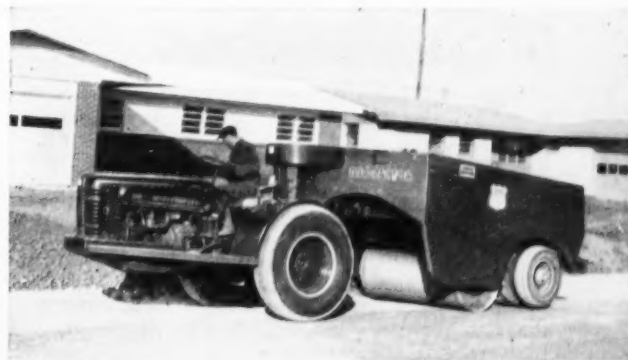
These savings result from the Duo-Pactor idea of combining small diameter steel roll and rubber tires to develop high compressive pressures. Vibratory roll and side-slope compactor attachments further adapt the Duo-Pactor to special requirements—literally giving you a *complete compaction and surface-rolling system* in one low-cost machine! Proof of Duo-Pactor savings: Contractors are now making repeat Duo-Pactor purchases to help beat the cost squeeze on 1957 contracts!



Barrus Construction Company, Kingston, N. C., "has found the Duo-Pactor most satisfactory. We have used it on streets, highways, air field runways and parking areas with excellent results."

Duo-Pactor is another development of Harry J. Seaman, pioneer in soil stabilization equipment and techniques for more than 20 years. Duo-Pactors and Seaman Duo-Flo Bituminous Distributors are manufactured only by Seaman-Gunnison Corporation.

- Duo-Pactors
- Duo-Scrapers
- Duo-Flo Bituminous Distributors



Ritchie Brothers Construction Company, Wichita, Kan., reports: "We use the Duo-Pactor to do the work of three machines on rock base and seal coating. It's fast, and does a mighty good job."

**Seaman-Gunnison Corporation,
Dept. CME-6, 2763 S. 27th St., Milwaukee 15, Wis.**

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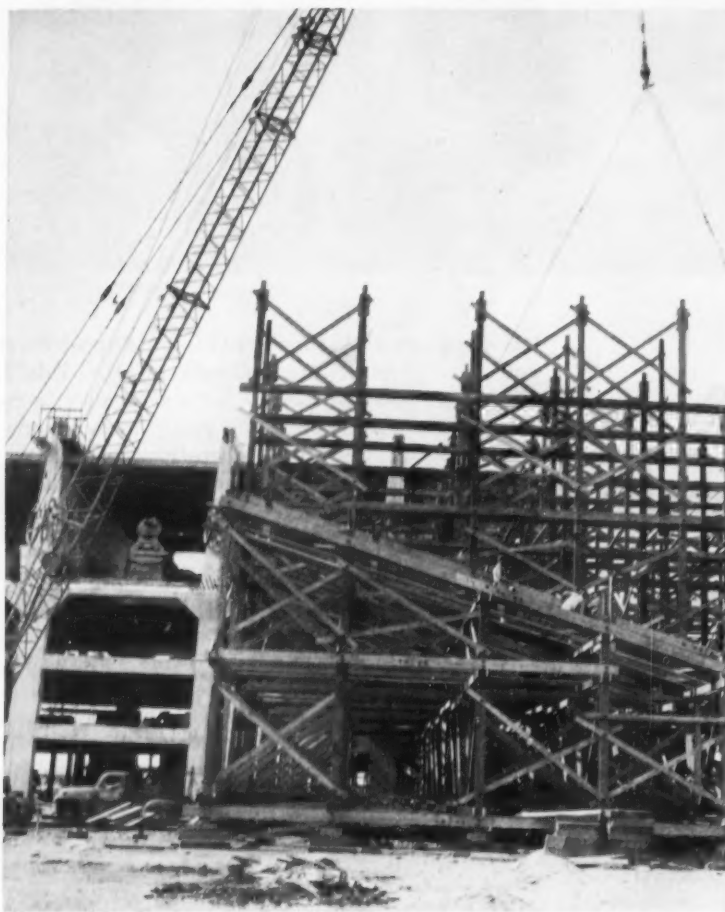
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ASSEMBLING THE TRAVELER—Crane lifts preassembled truss into position on traveler and holds it suspended until workmen can place cross and diagonal timber bracing to hold it.

into position against the roof slab where it will be secured to the suspension cable. The cable then will be stressed.

Tensioning the cables to proper stress will raise the end of the slab 2-in. This not only will set the slab elevation but will free the forms at every point except where the slab joins the anchor wall. The jack then will be lowered back onto its cart.

Form Stripping Will Test Traveler

Two control devices will prevent the bottom wedge from running loose during stripping and will insure that the upper wedge drops vertically. A cable sling will be run around the bottom wedge and out to a crane. As the bottom wedge backs out, this crane will move in to control the speed of the wedge movement.

To insure having the top wedge make a downward vertical drop, a cable will be run out from the center point of the upper wedge. It will travel through a sheave set at the top of the upper wedge, then down to the wedge's bottom where it will circle another sheave, and finally out several hundred feet to a deadman. The cable will retain its length and tautness as the bottom wedge moves out; only the angles at the top sheaves will change as the wedges move.

For the stripping, workmen will reverse the jacks carrying the upper wedge so that its wheels come in contact with the rails. Shims supporting the lower wedge will be knocked out bringing that down into contact with the rails.

The weight of the upper wedge then will begin pushing down on the lower forcing it to move outward while the upper wedge

Stripping Will Test Traveler . . .

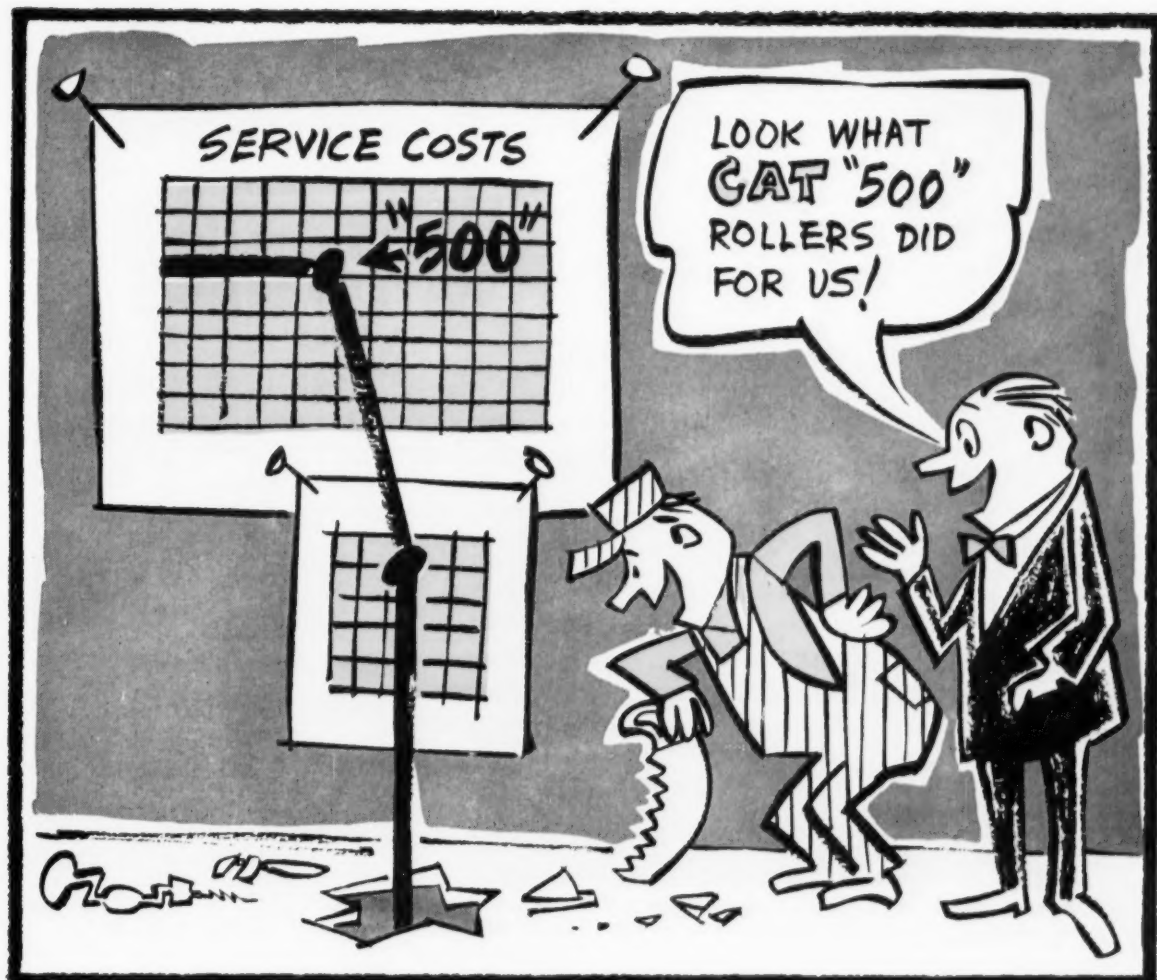


HOLDING WEDGES SECURE—Arrestor cable will run from upper wedge through sheave set at top of bottom wedge, through another sheave set at bottom of wedge, then over to a deadman.

moves down. The crane bearing the arrestor cable will move in slowly, controlling the rate of speed of the lower wedge. Finally, when the lower wedge moves out so that the upper wedge comes to a stop at the rail brakes, the whole traveler will be moved to the next pour section.

There the cables secured to the deadman will be reset in a new position. The crane then will back up, forcing the upper wedge to return to its first position. Jacks will be reset, shims placed, and the traveler will be ready again for a pour.

Corbetta personnel on the job include Raymond Vitolo, project superintendent; Thomas Tantillo, assistant; Don MacLeay, job engineer; Walter Campana, steel superintendent; and Joe Gardeski, traveler superintendent. Francis G. Carey is resident engineer for the New York Port Authority.



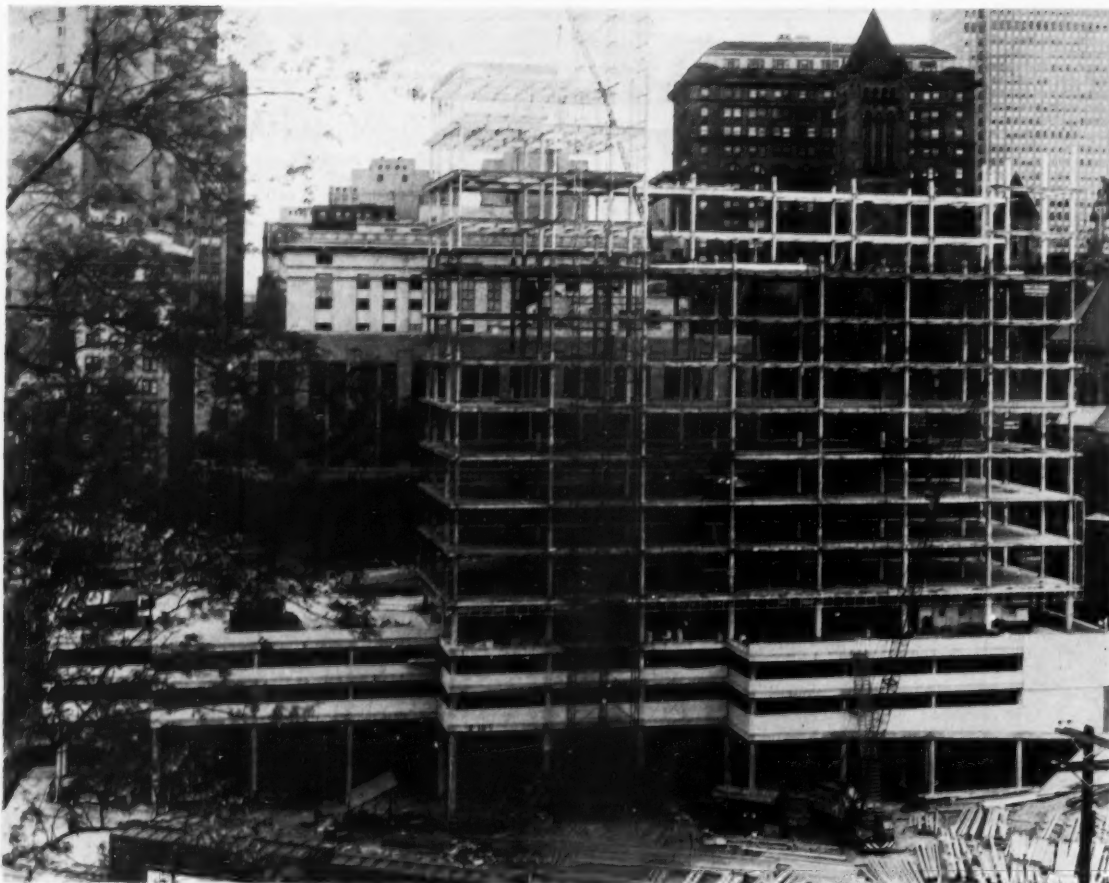
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Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

CATERPILLAR*

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STEEL FRAME is too light and too narrow to support single guy derrick big enough to do erection job. Instead, contractor modi-

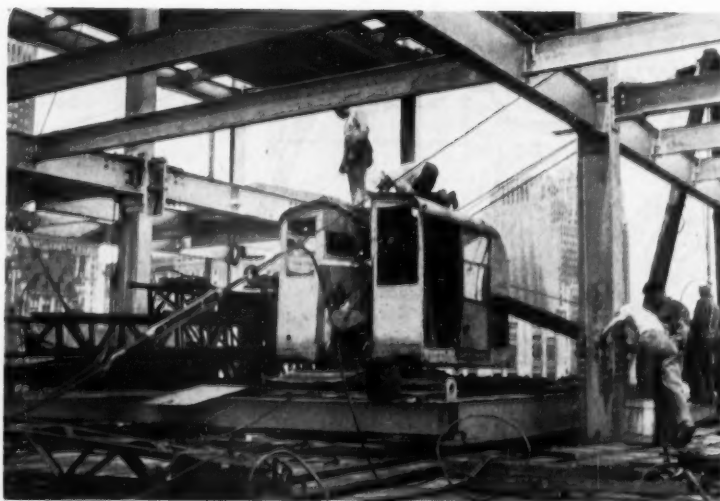
fied old Lorain truck crane, equipped it to jump itself two floors, then completed erection in half the normal time.

Small Crane Riding on Rails

HOW DOES A CONTRACTOR erect a 14-story building when the steel frame is too light to support a single guy derrick big enough to reach the farthest corners? If he's unimaginative, he might resort to a pair of light guy derricks—though the cost of two crews to erect only 945 tons of steel would be extremely high.

But a smart outfit like Minnotte Bros. of Pittsburgh found a better answer. To erect the new Forbes Building in Pittsburgh, they simply modified a small Lorain truck crane, made it capable of jumping from floor to floor, and then finished the job in half the normal time.

The method had lots of other advantages. It concentrated all operations on the working floor. The crane's movements were in



DISMANTLING of crane after final erection is fast. Workers knock down boom and release support frame. Note one of four pad eyes by which rig was jumped.



CRANE with 80-ft boom erects beams and columns in penthouse area. All steel handling is in clear view of operator, eliminating time-consuming bell signal system.

Erects 14-Story Frame



SMALL stiffleg derrick lashed to beams prepares to hoist and swing crane cab.

CAB hanging from stiffleg boom descends. Complete operation took only two hr.

full view of the operator, eliminating the time-consuming system of signal bells to an engineer in the basement. There was no booming up and down to clear guy cables and no bull stick for turning, as required by guy derricks. Besides, skilled guy-derrick men were short in the area.

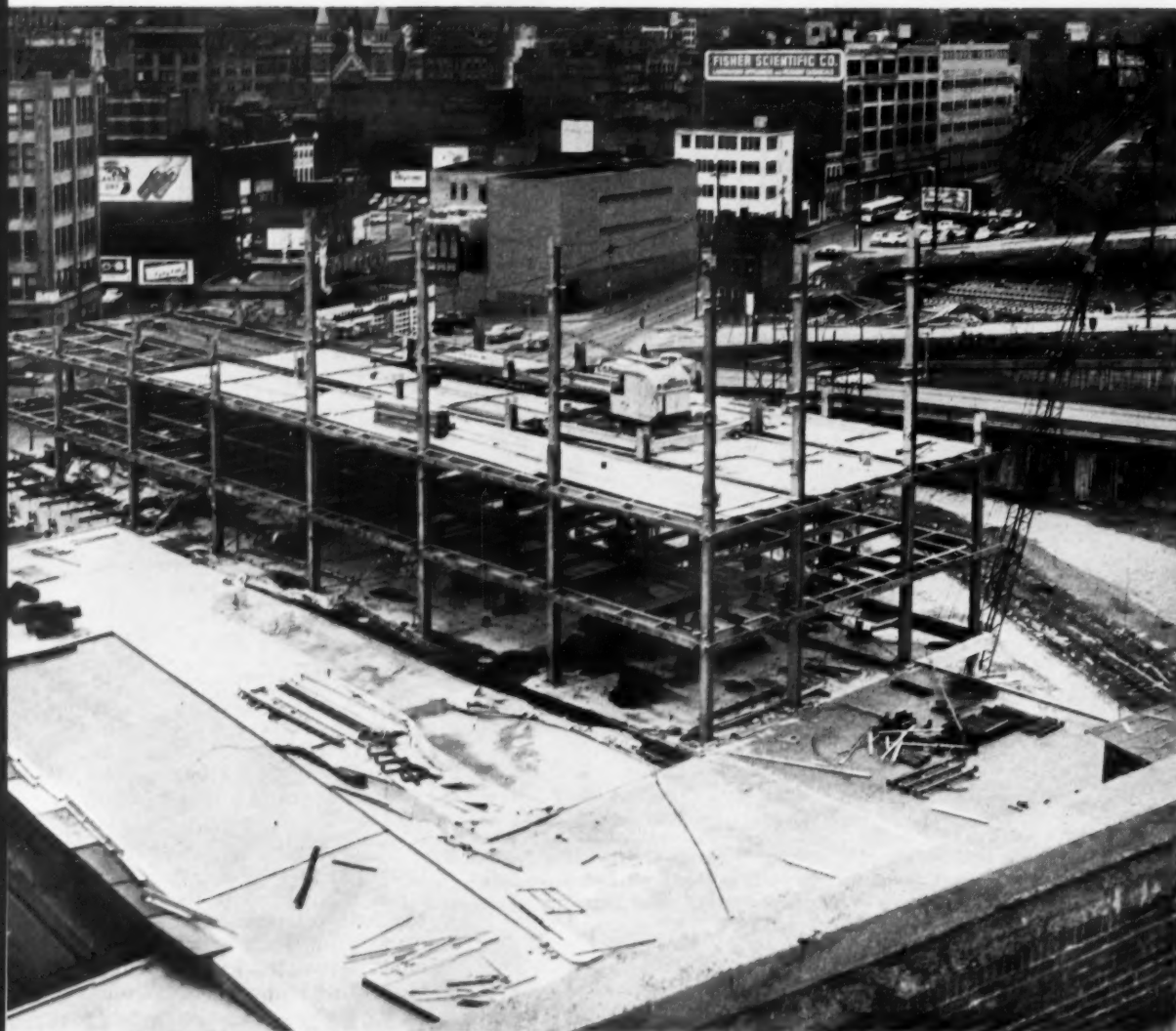
The steel building frame is 180 ft long, 53 ft wide, and has three longitudinal bays. Throughout the job, the crane operated from the middle bay.

The clever erection rig consisted of the superstructure from an old 7½-ton Lorain truck crane, complete with geared turning base, mounted on a steel support frame. Fitted with four double flanged wheels, the frame rode on temporary 80-lb rails laid the full length of the building. The rig was moved by a runner line from an engine-drive spool on the crane.

A larger truck crane on the ground started erection by placing two bays of steel and then hoisting the special rig in position to continue the operation. From here, the little crane moved back and forth erecting beams and columns at a fast rate. Speedy, accurate handling was assured because foreman, operator, and workmen were all in full view of each other.

Jumping the rig every two floors was extremely fast. Brackets were mounted on the tops of the four columns enclosing the crane. From these brackets were hung 6-ton spur-gear chain blocks that connected to the four





FIRST TIER of columns is erected and crane is in position to begin erection of second tier. Note full coverage of temporary plank-

ing on working floor. On higher floors, big crane fed steel to 7th-floor rehandling platform.



HOISTING POWER for lowering cab is provided by P&H truck crane on ground.

SMALL CRANE . . . continued

corners of the crane's support frame. In less than 2 hr, the rig could be hoisted two floors, outriggers telescoped over adjacent beams, and the crane lowered into position.

To assure adequate bearing, especially during heavy lifts, one 10-ton screw jack was welded to the outboard end of each outrigger for quick adjusting. If necessary, cables, shackles, and pins were available at each corner for tying down the frame.

During most of the erecting, a 50-ft boom with 15-ft jib was adequate. But on the high lifts in the penthouse area, an 80-ft boom was necessary. The job was completed in a matter of weeks.

When the rig's work was done, it was removed in just a few hours. A small stiffleg derrick was lashed to the building so that it could boom out over the edge of the frame. The rig was dismantled, and sections lowered to the ground with relative ease. Hoisting power for the stiffleg was provided by the large truck crane at ground level. During erection, this rig had fed steel to the small crane by transferring members from the ground to a simple 7th floor platform hung from the side of the frame on outriggers.

J. F. Minnotte is in charge for Minnotte Brothers. Henry C. Beck Co. of Atlanta, Ga. is general contractor.

SAVE MANPOWER

ON CONCRETE JOBS WITH *Whiteman* EQUIPMENT

POURING



One man with a Whiteman Power Buggy can pour as much concrete in one day as five men with hand buggies. Speed over narrow runways up to 16 m.p.h., up 25% grades. Never tire or slow down. Rugged. Reliable.

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Maximum efficiency is achieved with Whiteman Vibrators. Built for outstanding performance and durability to highest Whiteman standards. Three models, gas and electric, for every requirement.

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Only half the manpower is required to operate a Whiteman Screeding Machine. Does a better job, too. Vibrates throughout entire area, compacts slab, screeds to perfect level. Width adjustable 3 to 24 ft.

FINISHING



The work of six men with hand trowels can be done with just one Whiteman Finishing Machine . . . and far better. Produces an extremely smooth, level slab. Perfected over 17 years. 11 models for every requirement.

Whiteman

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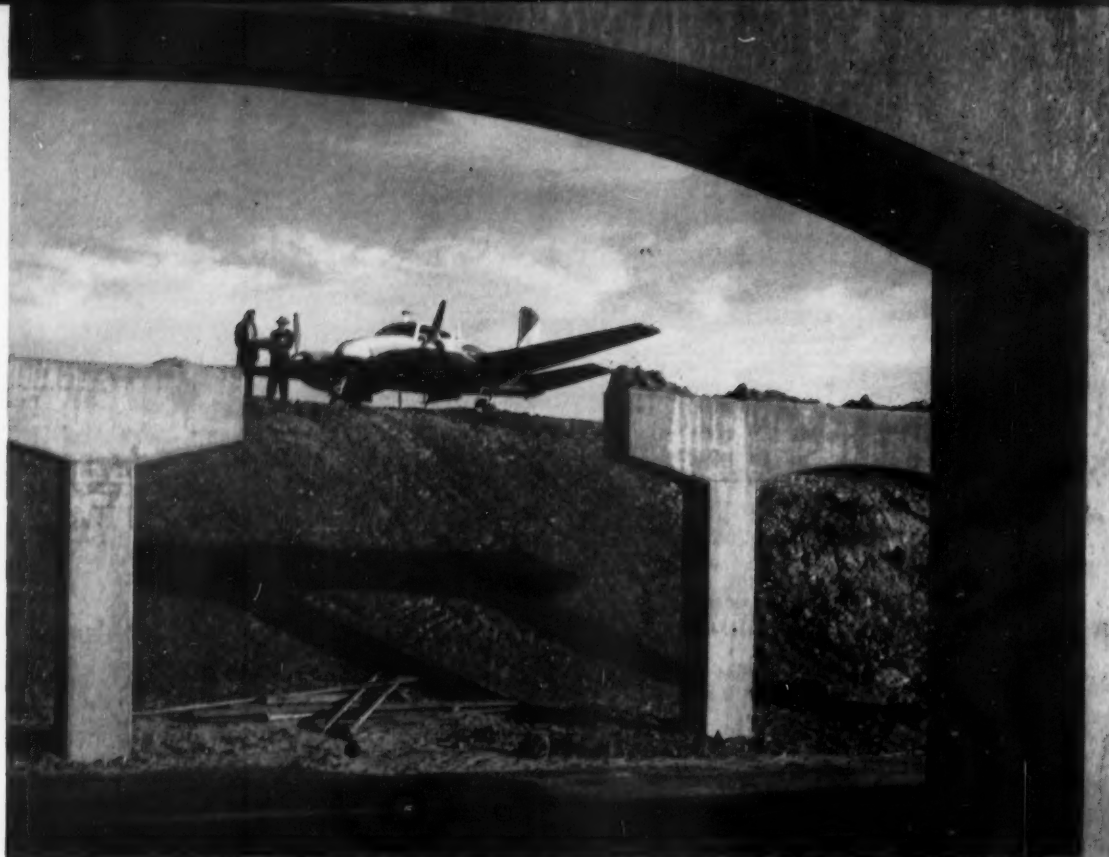
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Planes are a tool, not a luxury as...

Contractors Take to the Air

A CONSERVATIVE ESTIMATE of the distance flown by contractor personnel in company-owned planes last year is 5,000,000 mi.—roughly the equivalent of 200 trips around the world. Planes owned by contractors carried mail to remote dam sites, hauled desperately needed spare parts, and performed an amazing variety of other jobs.

Contractor-owned planes range from small, \$5,000 single-engined two-seaters flown by the company president to \$1 million, multi-engined aircraft piloted by professional crews.

Contractors now form the largest single group of business plane users, and business planes last year logged nearly half of the total hours flown in this country. The popularity of the contractor-owned aircraft has been growing at a rapid pace since World War II. It was at this time that many firms first realized the plane's value in supplying men and materials to remote projects. Another reason for their present

popularity is that commercial air travel increased rapidly during the war, and executives who used the airlines extensively soon came to appreciate the airplane's advantages.

Finally, tax structure of the post-war period has made the acquisition and operation of corporate-owned aircraft attractive. (Many contractors can depreciate a plane for tax purposes at a 25% annual rate although the average life of a plane is considerably longer).

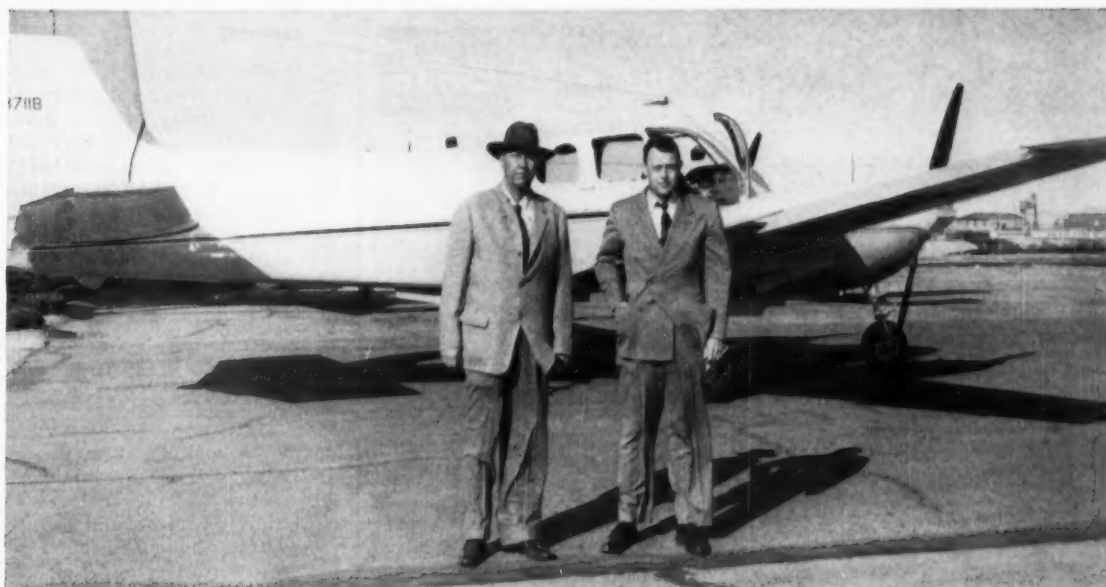
Today contractors are using their planes for an amazing variety of tasks. Perhaps the single most important advantage of the plane is that it brings the front office nearer to the job. As contractors continue to diversify their activities, this becomes an important consideration.

Often a contractor can cover the expenses of flying his own plane with what he saves by not having to establish branches or field offices that must be staffed with highly paid personnel. In

many cases, a company plane actually cuts normal travel expenses. And the value of having the right man at the right job at the right time is impossible to estimate. Busy supervisory personnel often report that the company plane enables them to shave five or six days a month off travel time.

Almost every owner can tell you about a time when his plane enabled him to carry a spare part or tool that was desperately needed by the men in the field. One contractor said the plane unquestionably increased his business by enabling him to get estimators to out-of-the-way project sites. Still others use planes for aerial studies that speed up pre-bid investigations of job sites.

One contractor reports that he often flies over several job sites a day, talking to his project managers by two-way radio while observing job progress. Another found that his plane was an invaluable prestige factor. And so the list of application grows.



Isbell, Lane, Villa—They Fly To Save Time



ROY ISBELL (left in top photo) takes delivery of new Beech Twin-Bonanza. George and Joseph Villa (center), project managers on Villa Contracting Co.'s Richmond-Petersburg, Va., turnpike job, board Cessna 310 for 1½-hr trip to New Jersey office. Lane president Arthur Eggleston (left, above) starts inspection tour.

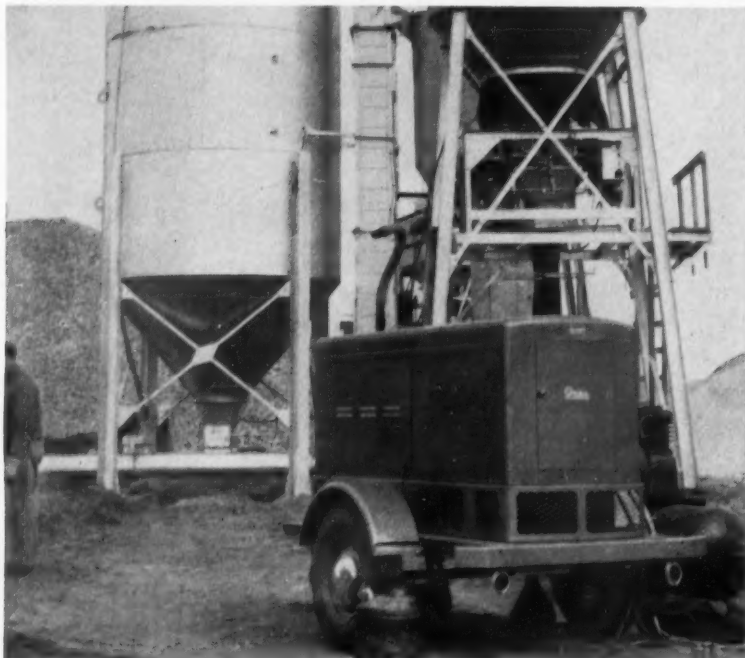
Some companies are willing to credit the airplane with playing a major part in their recent expansion. A case in point is the Ruscon Construction Co., rapidly growing industrial building contractor from Charleston, S.C.

"The use of aircraft has extended our activities from a radius of 100 mi from our main office to our present operation," according to F. S. Conrad, Jr., vice president and secretary of the firm. "We now are able to cover a five-state area and maintain just as close contact with our work as we did when it was all within a comparatively short range of our home office."

Ruscon bases one of its two single-engined, four-place Beechcraft Bonanzas at its main office in Charleston; the other operates to and from a recently opened Jacksonville, Fla., branch office. Conrad regularly handles the controls of one plane, and the company's other pilot is president R. B. Russell. Last year Ruscon officials logged 100,000 mi,



ELECTRIC PLANT NEWS



Remote-site bulk cement plant operates on Onan electric power

35KW Onan Plant supplies electricity for one 15 H.P., one 5 H.P., and two 2 H.P. motors; vibrator, controls, welder and lights

It's a completely electrified operation . . . even to electric lights in the mobile office nearby . . . yet this bulk cement plant is far distant from the utility highline. The Onan heavy-duty electric plant, powered by an 8-cylinder, water-cooled industrial gasoline engine, runs continuously during working hours with only a minimum of attention. Has capacity to operate miscellaneous lights, tools, motors and communications, too.

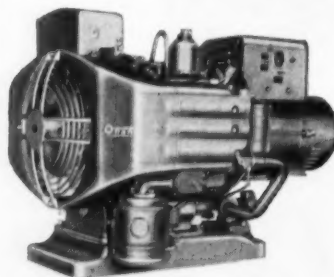
Where efficiency demands that an operation like this one be located close to the job site and where utility power is not available, a mobile Onan Electric Plant is the answer.

Other A.C. models: 500 to 75,000 watts. Also D.C. and Battery Charging units
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AIRBORNE CONTRACTORS . . . continued

frequently flying 1,000 mi a day to cover five or six different jobs.

"We simply use our planes as offices-in-the-sky," says Conrad.

Another medium-sized contractor, Ray Clinton, president of the Clinton Construction Co. of Sikeston, Mo., also finds a close relationship between the purchase of a single-engined plane and company growth. "Without a doubt, we are now doing a larger volume of business than before we purchased the plane," according to Clinton.

Clinton, a former Air Force pilot, bought a single-engined Cessna 172 last summer. The firm handles school and industrial building projects and has specialized in the construction of big grain elevators.

"This type of work takes us out into the smaller communities where it is virtually impossible to fly by airline. We find that by owning our own plane we are able to go directly to the job whenever we please, often landing in a nearby field. We save time, we maintain close front-office supervision of our various projects, and we've actually reduced our travel expenses," Clinton said.

"Last fall we had projects going in central Mississippi, south Arkansas, and central Arkansas. Many times I would leave Sikeston early in the morning, visit all three jobs, and return to Sikeston the same day—logging more than 700 mi. Had I been traveling over the highways, the circuit would have taken two days and two nights."

Ralph Brown, president of Mercer-Fraser Co., Eureka, Cal., ready-mix and paving contractor, says, "If we didn't have the plane, (a twin-engined Camair) we wouldn't have the jobs that we do. For me, it's no luxury. I'm no kid anymore, and I can't drive all day and work all night. Don't misunderstand me . . . I delegate authority, but I do like to get out as often as possible to our jobs."

Brown's plane is operated by Claude Crawford, a professional pilot. But like many other company pilots, from flying with top company personnel he has learned enough about Mercer-Fraser's operation to double in brass—he is also company safety manager.

continued on page 128



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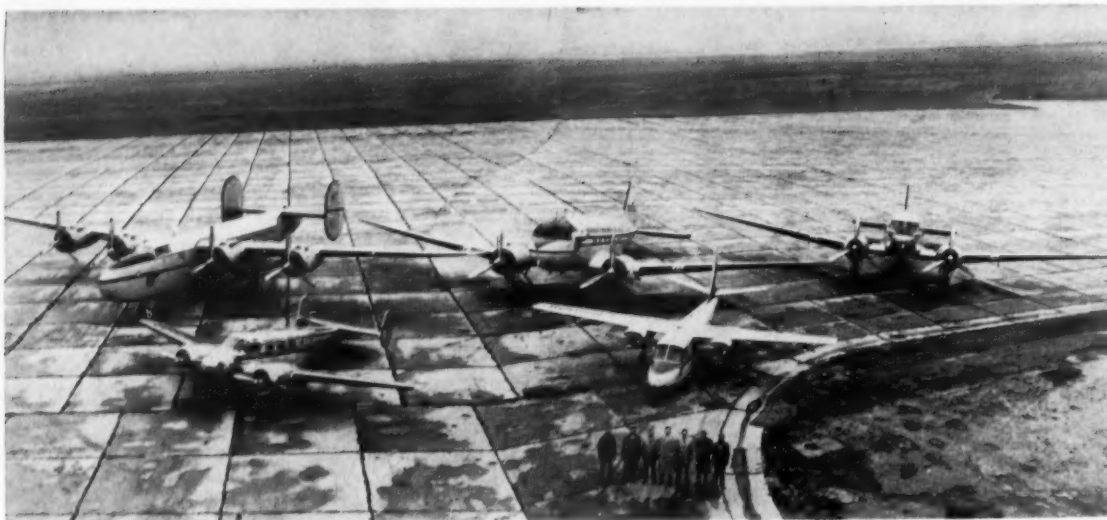
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FIVE of M-K's fleet of seven planes flew top personnel from all parts of the country to conference at Boise headquarters.



BIGGEST contractor-owned plane, four-engined LB30, supplies M-K jobs in Alaska.

AIRBORNE CONTRACTORS . . . continued

Morrison-Knudsen Flies A Million Miles Yearly

The larger construction companies have been operating fleets of their own planes for years. Generally they operate and maintain a nucleus of their own aircraft for executive use and supplement their fleets by chartering planes for specific projects.

The seven planes owned and operated by Morrison-Knudsen Co. last year logged better than 1,000,000 mi. M-K's air fleet has become an indispensable means of transportation for fast-moving executives to whom time and distance are constant headaches.

M-K's aircraft operation is probably the most extensive in the industry. The firm's planes



M-K's FLAGSHIP, the plush DC3 Lady Ann, is assigned to president H. W. Morrison.

AIRBORNE CONTRACTORS... continued

range from a giant four-engined reconditioned B-24 to two single-engined Cessna 180's. The other planes are two DC3's, an Aero Commander 520 (the same type used by President Eisenhower to travel from Gettysburg to Washington), and a twin-engined Beechcraft S-18.

The commercial prototype of the big B-24 war-time bomber, called the LB30, can carry 34 passengers or 14,000 lb of freight. Based at Anchorage, Alaska, it has landed at practically every airport in the territory to deliver supplies to remote M-K projects.

The flagship of the fleet is a DC3 assigned to president H. W. Morrison, who has flown in it to Canada, Mexico, Central and South America, and to all parts of this country. The other DC3 is assigned to general manager J. B. Bonny. The Beechcraft S-18 is based at Los Angeles and assigned to J. N. Wells, district manager. The twin-engined Aero Commander is based at Boise and used principally by executives of the dam division, one of M-K's biggest.

The giant construction firm also makes good use of its two small Cessnas. One of them, carries personnel between the Boise office and the Brownlee Dam construction site, one of the three dams scheduled for the Hells Canyon area. The other plane is based at Wishom Dam in Southern California. Here it is pressed into almost daily service to fly over mountainous terrain to Fresno. The plane covers the 83 mile in 15 minutes.

To handle its big fleet, Morrison-Knudsen has an elaborate maintenance base at Gowen Field, Boise. At this shop a staff of mechanics that one engine manufacturer called "the best in the country" does everything except major overhauls.

In addition to the planes it owns, M-K often charts large fleets to handle specific projects. To service a series of defense projects for the Air Force in remote Alaskan territory, M-K chartered a fleet of 13 planes under a full-time contract. These ranged from single-engined "bush" planes with pontoons or skis to a giant Globemaster that can carry D8 tractors with ease.

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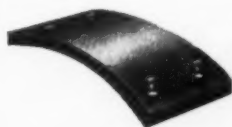
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FIFTEEN POPULAR BUSINESS PLANES:

What they sell for, what they do, what it costs to fly them

	Average Price	Cruising Speed	Range	Passengers (a)	Annual Costs (b)	Costs per Passenger mile (c)
Piper Tri-Pacer	\$ 7,895	130	490	4	\$ 6,000	\$0.043
Mooney M-20	12,500	165	575	4	6,900	.039
Cessna 180	14,000	150	695	4	8,200	.051
Beech Bonanza	22,000	180	650	4	11,700	.060
Helio Courier	25,600	155	485	4	11,800	.070
Piper Apache	36,790	170	605	4	17,200	.094
Cessna 310	60,645	205	870	4	33,400	.151
Grumman Widgeon	70,000	170	660	4	36,100	.197
Beech Twin-Bonanza	78,000	200	815	5	40,200	.149
Aero Commander 560	79,500	200	1,060	5-7	38,800	.160
DeHavilland Dove	108,450	185	1,240	6	56,600	.189
Beech Super-18	125,000	215	1,455	5-7	63,100	.182
Lockheed Lodestar	175,000	240	1,100	8-10	119,000	.204
Douglas DC-3	240,000	200	1,350	14	127,500	.154
Convair 340	750,000	285	2,500	18-22	280,300	.183

Figures based on questionnaire submitted to business plane owners by the National Business Aircraft Assn.

(a) Excludes pilot for twin-engined planes beginning with Piper Apache.

(b) Covers all major operating costs, including crew's salary for twin-engined planes, hanger fees, insurance, maintenance, fuel, etc., for a plane flown 600 hr a year.

(c) Based on 50% passenger load, about the average, for business planes operated 600 hr a year.

AIRBORNE CONTRACTORS...continued

Choose a Plane That Meets Your Needs

The most important question that a contractor—large or small—who is considering buying a plane must ask is not whether a plane would be an asset (CM&E found no owner who didn't consider it one) but what type is best suited for his operation.

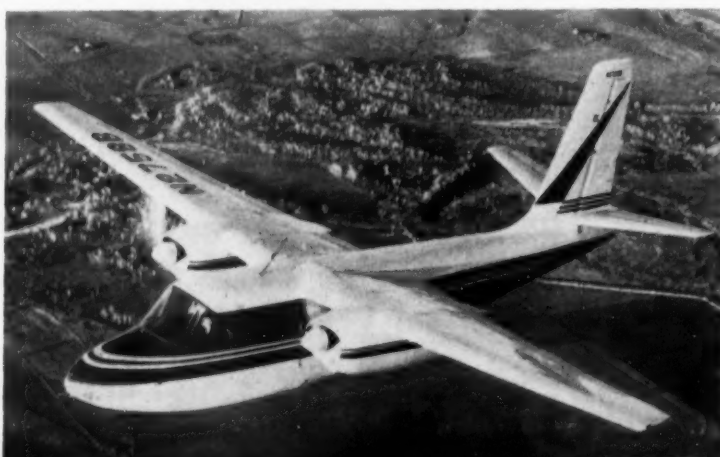
Contractor-owned planes break down into basic types: the single-engined, three- or four-seater such as the Piper Tri-Pacer, the Cessna 182, or the Beechcraft Bonanza; the five-to-seven-passenger, twin-engined planes such as the Aero Commander, the Twin Beechcrafts, Twin Cessnas, and the Piper Apache; and the larger, 10-to-15-passenger, multi-engined planes such as the converted DC3, the Lockheed Lodestar, and others.

Apparently it doesn't take long to discover whether a particular plane suits your needs. First and second year trade-ins of planes operated by first-time owners is high, but in the majority of cases the owner is not giving up the idea of operating his own plane; he is simply trading in his original plane for one better suited to his needs.

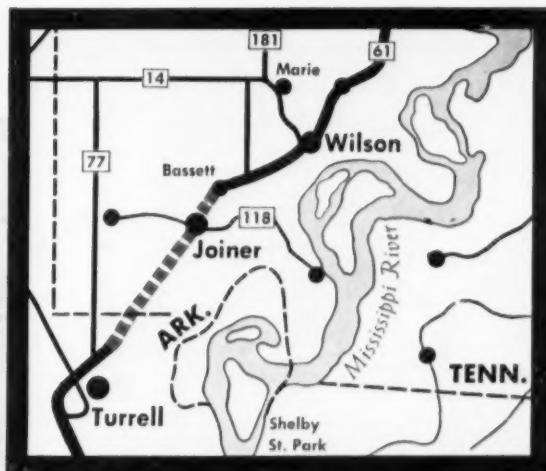
Before buying a plane a contractor must evaluate how it will



FOUR-PLACE Beech Bonanza (above) with a top speed of over 200 mph is a fast, single-engined business plane. Below, Aero Commander 560 carries up to seven passengers at speeds in excess of 220 mph. It can fly cross-country with one fuel stop and once flew from Oklahoma to Washington, D.C., on one engine.



Super-Scooper! One of D. B. Hill's big T-12's in action on the Highway 61 project in Arkansas. Hill uses Esso products exclusively in all of their 100 pieces of equipment.



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helps keep engines clean, avert breakdowns with new **ESSOLUBE HD**

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Essolube HD contains a new detergent inhibitor with improved

low- and high-temperature detergency that reduces sludge deposits and minimizes ring sticking and piston varnish deposits. Further protection is assured by Essolube HD's improved anti-wear properties, oxidation stability and bearing corrosion resistance.

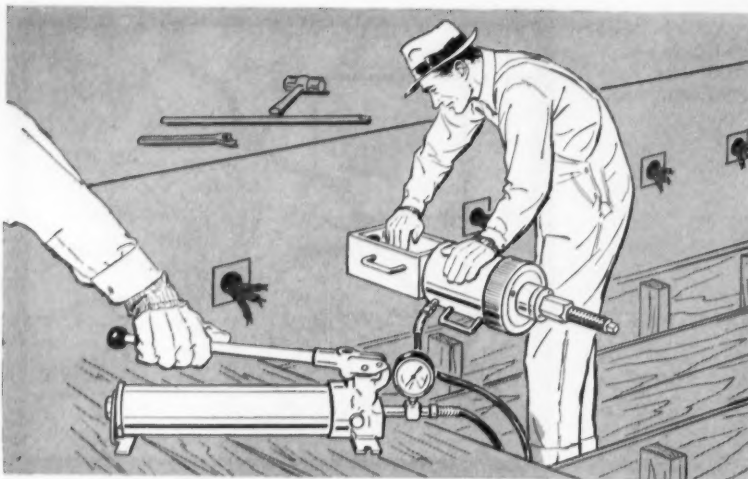
Hill has been using Esso fuels and lubricants *exclusively* for 22 years. Accurate operational records show that in all that time, *there has not been a single failure* due to the fuels or lubricants used!

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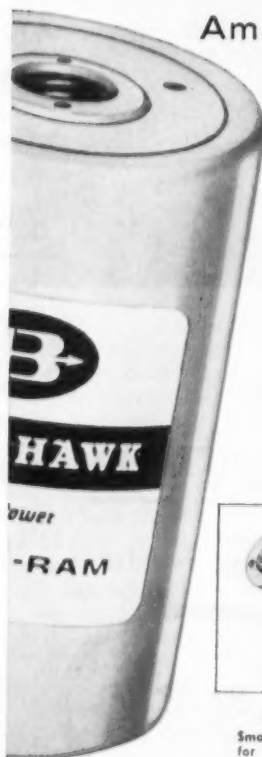
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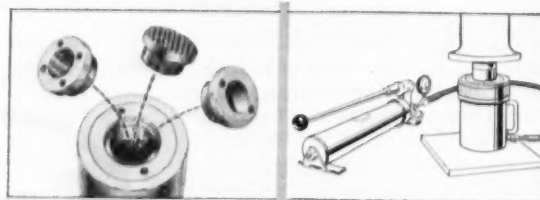
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AIRBORNE CONTRACTORS ...

be used and by whom, where it will land, and what distance it will be expected to cover. Other important considerations are the type of terrain it will fly over, the load it will normally carry, the weather it will be asked to fly through, and the amount the owner is willing to spend for the plane and its operation.

The cost of maintenance and operation is an extremely important consideration, and it can vary greatly depending on the type of plane. In many cases, yearly operating costs approach 50% of the original purchase price of the plane. These costs soar as the plane gets bigger. This is because most twin-engined planes are flown by professional pilots whose salaries range from \$7,000 to \$15,000 a year and because it costs more to keep a bigger plane in good working order. (For some of the heavier two-engined planes, it can cost as high as \$400 to change spark plugs). Hangar fees, insurance costs, and fuel consumption naturally are higher for the bigger plane.

For two reasons, it is impossible to avoid high maintenance bills. The Civil Aeronautics Administration requires frequent inspection of all types of aircraft. It is generally necessary to remove and overhaul engines every 700-800 hr, and pre-flight, 25, 50, and 100-hr checks are required.

The second reason for high maintenance bills is just common sense: a plane must be kept in top shape because you seldom walk away from one that crashes. According to the CAA, incidentally, the death rate per 100 million passenger miles last year for commercial airliners was 0.58; for business planes, the figure was only 0.14. This compares to an average of 2.9 deaths per 100 million passenger miles for private automobiles.

Usually the out-of-pocket cost per passenger mile is higher for those who fly in private planes than it is for those who use other means of transportation, including commercial airliners, but the cost of operation per passenger mile drops rapidly the more the plane is used.

The cost per passenger mile rises drastically if a plane is not used much. According to the National Business Aircraft Asso-

continued

ciation, the cost of operating a typical light twin-engined plane is about 25 cents per passenger mile when it is used only 300 hr a year. When the plane is flown 600 hr a year, the cost per passenger mile is reduced to about 15 cents. These figures are based on a 50% passenger load, which is about the average carried on most business planes.

The reason for the sharp increase in the cost of operation when a plane is not used much is that the owner must pay a number of fixed charges regardless of how often he flies. These include charges for hangar space, most insurance coverages, and pilot salaries.

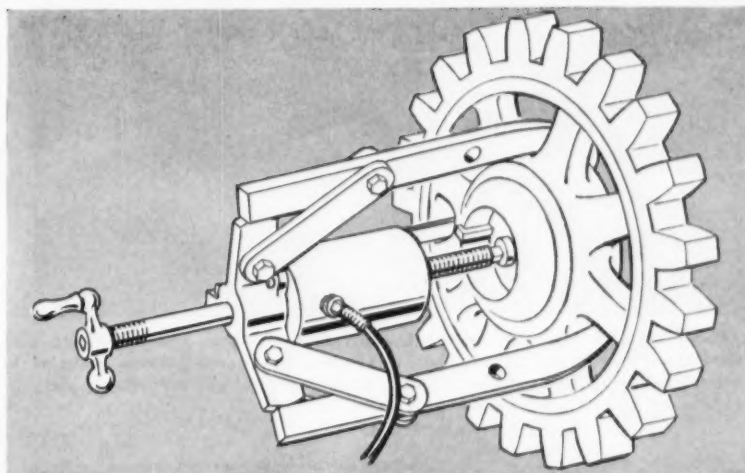
The four-passenger, single-engined plane is still the contractor's workhorse although this type of plane has a number of drawbacks. Its range and load carrying capacity are limited; it can carry only a minimum of navigational equipment, which limits bad-weather and night flying; and it travels at a relatively low speed.

But the single-engined plane can land on shorter air fields (including home-made strips at the job site), and its maintenance and operating costs are lower than for larger craft. The single-engined plane is often flown by company personnel, and the salary of a professional pilot is eliminated.

The CAA estimates that more than 90% of single-engined planes are operated by company personnel rather than by professional pilots. Single-engined planes are ideal for the company that will use a plane only 300-500 hr a year to cover a 600 or 700-mi radius.

Plane manufacturers in recent years have developed an increasingly popular line of light twin-engined planes. These planes, which sell for between \$35,000 and \$75,000, seat from five to seven passengers comfortably. They can travel at distances of up to 1,000 mi without refueling at speeds of from 180 to 250 mph.

They are safer than single-engined planes because of the extra power plant and also because they carry more navigational equipment and so can travel in all but the worst weather. Probably the first type of plane designed specifically for business use, the light two-engined plane retains many of the features of



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LARGEST SELLING light, twin-engined business plane, the Piper Apache (above) is priced at less than \$40,000 fully equipped. It seats four, has a range in excess of 600 mi. Cessna 310 (below) cruises at over 200 mph. It has a range of well over 800 mi, and it can land and take off from relatively small strips.



AIRBORNE CONTRACTORS... continued

the single-engined plant. It is fairly easy to fly and because of its low landing speed it can use any airport in the U.S. According to the CAA, only about 50% of these planes are piloted by professionals.

Heavier two-engined planes, such as the DC3, are used to advantage by some of the larger construction firms. Generally they are purchased from companies that make a business of reconditioning big planes, and they can be tailored to meet your needs. Some interiors on planes of this type are as plush as first-class cocktail lounges.

These planes have the capacity to carry big loads for greater distances than any other type of business aircraft. However, they require a longer airstrip, and they are almost all flown by professional crews. Maintenance requirements also are more expensive.

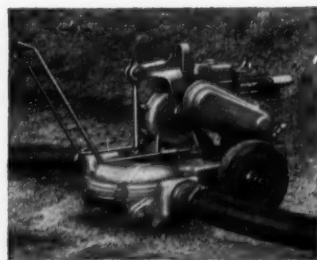
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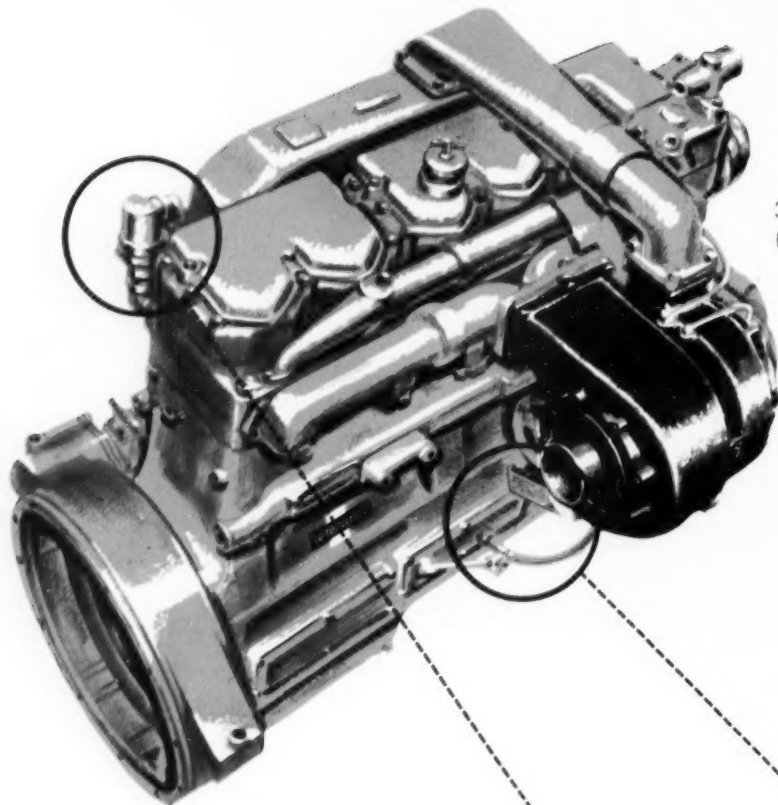
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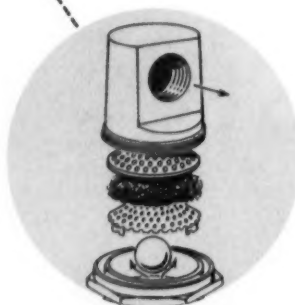


ANNOUNCING NEW CUMMINS

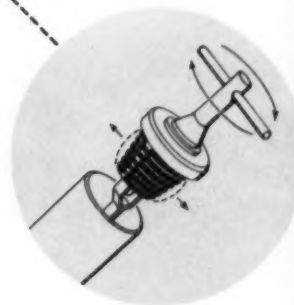


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Cummins Air-Induction System . . . defeats dirt!

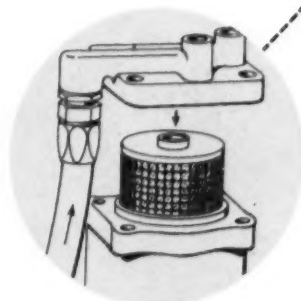
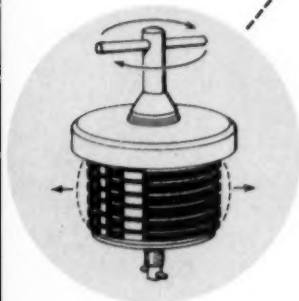
A secondary way dirt enters an engine is through the air intake system. The following Cummins *firsts* (see right), coupled with the oil bath air filter, give maximum protection against dirt: (A) specially developed "hump" hose; (B) airplane-type clamps; (C) 90° molded rubber hose; (D) stainless steel welded tubing; (E) newly designed dry-type air filter. Cummins Air-Induction System provides the most modern and efficient protection available against the effects of dirt.

DIRTPROOFING SYSTEM

335 h. p. TURBODIESEL® Engine
(fuel pump side)



3. New Airtight Oil Filler Cap
"Bottle-stopper" twist-on cap provides seal at oil port against dirt and grime.

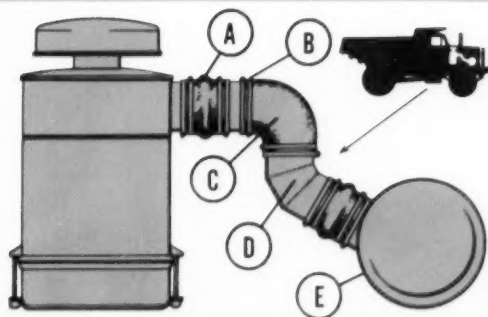


4. New Oil Filter

Cummins improved oil filter:
(1) allows freer passage of lubricating oil, and (2) captures and holds more dirt.

CUMMINS

MORE PROFIT



Cummins Fuel System... defeats dirt!

Dirt sometimes makes its way into diesel fuels, subjecting the moving parts in the fuel system to excessive wear. Here, too, Cummins has developed superior protection for construction diesels. The PT system's fuel filter eliminates harmful contaminants . . . keeps dirt from entering the fuel system . . . passes through dirt-free fuel. Cummins new dirtproofing system is just another reason why more and more contractors specify their power and *Standardize on Cummins!*



Cummins dirtproofing accessories are available in kit form right now! Your Cummins Distributor can convert models in the field with minimum delay. He can also arrange for you to see the new 28-minute film, "Operation Hourglass," showing how Cummins research has overcome the devastating effects of dirt on diesels. Defeating dirt is another great Cummins achievement. It's just one more reason why, for the last 25 years, Cummins has led in the development of high-speed, lightweight diesel power for automotive, industrial, construction and marine users.

Cummins Dirt Protection features are available on heavy-duty construction equipment made by:

TRUCKS

Autocar
Cline
Cook
Crane Carrier
Dart
Diamond T
Euclid
Federal
Four Wheel Drive
Hayes
Hendrickson
International
Kenworth
Mack
Oshkosh
Pacific
Peterbilt
Reo
Sicard
Walter
White
PAVERS
Koehring
Worthington

SHOVELS, DRAGLINES, CRANES, HOISTS

American
Bay City
Bucyrus-Erie
Clyde
Dominion
Gradall
Industrial
Brownhoist
Insley
Koehring
Lima
Link-Belt
Manitowoc
Marion
Ohio Locomotive
P&H
R. G. LeTourneau
Thew
Wellman

COMPRESSORS

Worthington

SCRAPERS

Euclid
International
LeTourneau-
Westinghouse
Michigan
M-R-S
Wooldridge

LOCOMOTIVES

Baldwin-Lima-
Hamilton
Canadian
Locomotive
General Electric
Plymouth
Vulcan

COMPACTORS

Buffalo-
Springfield

LOADERS

Clark
Eimco
Michigan
Pettibone-Haiss
Scoopmobile

TRACTORS, DOZERS

Eimco
LeTourneau-
Westinghouse
M-R-S
Wagner
Westfall

CRUSHERS

Bros
Iowa
Rogers
Universal

DRILLS

Bucyrus-Erie
Reich

PULVERIZERS

Bros
Pettibone-Wood

GRADERS

Adams
Galion
Huber-Warco

AUGERS

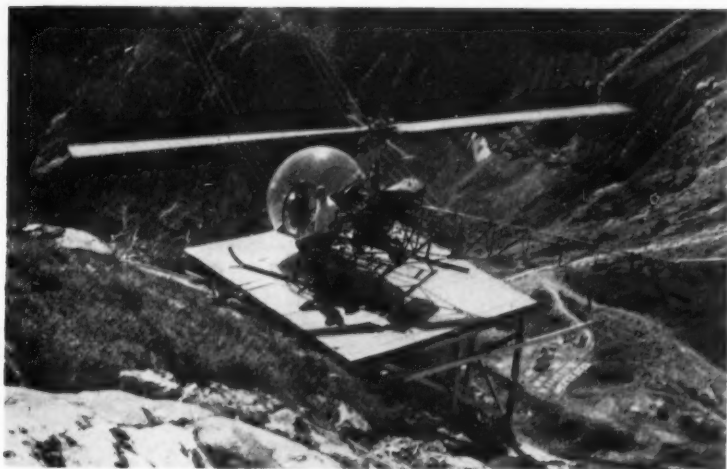
Compton

CUMMINS ENGINE COMPANY, INC. COLUMBUS, INDIANA

EXPORT — CUMMINS DIESEL EXPORT CORPORATION — COLUMBUS, INDIANA, U. S. A. — CABLE: CUMDEX
OVERSEAS FACTORY — CUMMINS ENGINE COMPANY LIMITED — SHOTTS, LANARKSHIRE, SCOTLAND — CABLE: CUMSCOT



HELICOPTERS demonstrate big feature—they land anywhere. In photos, Bell units land adjacent to road job and at remote construction camps in Canadian mountains.



AIRBORNE CONTRACTORS...
continued

Whirly Birds Can Land Any Place

In recent years another type of aircraft, the helicopter, has caught the fancy of some contractors. In many ways it is an ideal contractor's tool. Its advantages are obvious: it can set down practically any place; it can hover in the air while passengers study a project; it has even been used to move equipment, such as forms, by picking them up with a sling.

The disadvantages of a helicopter are just as obvious: its flying speed is low; its range is short; and its maintenance costs are higher than for conventional aircraft.

For performing certain jobs, however, it can't be topped. On the Aluminum Company of Canada's vast Kitimat project, the



AIRBORNE CONTRACTORS...

continued

helicopter is credited with opening an otherwise inaccessible area for development. The helicopter was called upon to survey the rugged Canadian site, to carry engineers, carpenters, and cooks from their camps to their work sites, to carry supplies to inaccessible areas, and to haul out men with injuries ranging from broken fingers to broken backs.

The chartered Bell and Sikorsky helicopters landed and took off from frozen lakes, from wooden platforms built out over mountain slopes, from snow-covered peaks, and from areas where a few trees had been cleared minutes before. They were credited with saving several lives and with performing tasks that no other type of transportation, outside of pack mules, could have handled.

How To Buy

Purchasing planes for business use is a relatively painless procedure. Seldom is a large cash

outlay required, except for the heavier, multi-engined planes. The CAA reports that almost 85% of the business planes now in operation were purchased under some sort of a finance or lease-purchase arrangement.

While many of these financing plans were arranged by plane dealers through local banks or credit organizations, in recent years the manufacturers themselves have made credit purchasing easier by establishing their own financing subsidiaries.

The advantages of financing or leasing are that the contractor can pay for a plane out of current income without tying up funds in a straight cash purchase. And lease payments, as well as interest charges, are tax deductible. One dealer points out another reason for financing a plane: "Some organizations would rather not buy a plane outright because they don't want to disturb their more conservative directors or stockholders by carrying a plane on their books."

In the past two years Beech Acceptance Co., a subsidiary of Beech Aircraft Co., has provided

more than \$5.5 million in pay-as-you-fly financing. They now offer four plans to meet the varying needs of their customers. Beech's typical straight financing arrangement calls for a down-payment of from 20% to 33% of the purchase price, depending on the type of plane, and equal payments for a 36-mo period. Beech claims that the average interest cost for their various finance or lease-purchase plans is about 2% below interest costs for automobile financing.

The most popular way to secure a plane is through some type of lease-purchase plan. These operated in much the same manner as the plans offered by other manufacturers of capital goods. Beech and the National Aero Finance Co., a Cessna subsidiary, offer this type of plan, and most dealers of other aircraft are more than willing to arrange a lease-purchase plan through local banks.

Under Beech's plan, the dealer delivers the plane to the contractor upon payment of a deposit—usually 7½% of the purchase price—and his first monthly



Scoopmobile model LD 5P loading shot rock at Bowman Sand & Gravel Company, Albany, Oregon. Capacity of loader is 1½ cubic yards.

100%
Breakout
Bucket
Action...
even in
shot rock

Loading shot rock is a job to test the stuff of any loader. But with 100% breakout bucket action this Scoopmobile makes it look easy.

The bucket clears a path the full width of the wheels to eliminate deflection on the tires. Four-wheel planetary drive gives power to spare. Full visibility, power steering, power shift forward and reverse transmission, and 4-wheel power brakes lighten the work of the operator. It's even easy for him to get in and out of the cab!

To learn how Scoopmobile will tame your tough loading jobs, see your nearest Scoopmobile dealer, or write us for information. You'll hear from us promptly.



100% Longer Life...

"Down-Time" Cut in Half...

WITH **New LAY-SET VHS Dragline**

—at Memphis Stone & Gravel

**HAZARD
LAY-SET**

VHS

**15%
Stronger**

Mr. L. C. Ring, Vice President, Memphis Stone & Gravel Company, Memphis, Tennessee, says: "Our No. 6 Northwest Dragline is used in an open pit on sand and gravel service. We were only getting about 50 hours of service from the best Improved Plow Steel Draglines we could buy. However, since we switched to new LAY-SET VHS we are averaging 102 hours, getting over twice as much service life."

"But the longer wire rope life is only part of the saving we are making with new VHS. By using this new, tougher wire rope, we have been able to cut equipment 'down-time' for wire rope replacement by over 50%—a very significant cost reduction."

New Grade of Steel

Enthusiastic users are reporting similar savings all over the country in the toughest wire rope applications—draglines, shovel hoist ropes, and winchlines. Developed specifically for these tough applications, new VHS (Very High Strength) wire rope is made from a new grade of steel... is at least 15%

stronger than Improved Plow Steel, the strongest grade formerly available.

This allows you to handle heavier loads with the same diameter of line. It gives you a higher factor of safety... provides greater insurance against sudden over-stressing.

Tougher, More Wear-Resistant

In addition to its greater strength, new LAY-SET VHS is tougher. It resists abrasion... keeps its shape under pressure... can't become "hidebound" or lose its flexibility.

As a result, it lasts longer in the tough applications for which it was developed. And, as Mr. Ring and countless others can testify, this means important savings... both from reduced wire rope costs and the reduction of equipment "down-time."

At Your Distributor

Your nearby Hazard distributor has draglines, shovel hoist ropes and winchlines of new LAY-SET VHS. Call him today for speedy delivery. You don't need any complicated specifications in your order—just tell him the size and diameter you want.

For more information see your Hazard distributor salesman or write to the nearest Hazard office for Bulletin DH-513H

HAZARD WIRE ROPE DIVISION

American Chain & Cable Company, Inc.

Wilkes-Barre, Pa., Atlanta, Chicago, Denver, Houston, Los Angeles, New York, Odessa, Tex., Philadelphia, Pittsburgh, Portland, Ore., San Francisco, Bridgeport, Conn.

COMMENT

from the
BUTLER ENGINEER

Is "Capitalist" a Dirty Name?

Sure there are faults and inequities in our capitalistic system—but the point is, as a people we can do something about it.

One thing that should have been done, and long ago, is to teach our respected government the difference between "depreciation" and "obsolescence". As a manufacturer of ready mix concrete or a concrete highway, your interest is as vital as ours; we as a manufacturer of the equipment you use.

Allowable reserves for depreciation are, in many cases, completely unrealistic. Your Roadbuilders Plant or Ready Mix Plant will last for 10 to 14 years—or so says the Government. Would you try to compete using the exact plant you bought when your beautiful teen-age daughter was a pink pearl in her bassinet?

Npt to inject the horrible word "advertising" in this discussion—but as a case in point: two years ago we brought out the Butler 0-1-0 Roadbuilders Plant. It made everything before it absolutely obsolete. And this year we've brought out the TX4 which completely obsoletes the 0-1-0... Yet Government says "your 0-1-0 cannot be written off until 1972".

And it's the same thing with the equipment we install in *our* factory to make the equipment *you* use. But Government would lose taxes! Nuts! If equipment *could* be written off in one year Washington wouldn't lose a penny, because the year following, we'd have no depreciation write-off. Meantime you and we would be able to buy the best, newest and most cost-cutting replacement. Construction publication editors—please note. This subject deserves support.

Regards,

The Butler Engineer

BUTLER BIN COMPANY
WAUKESHA, WISCONSIN

AIRBORNE CONTRACTORS... continued

"rental" payment. The lease remains in effect for four years. At the discretion of the plane user, he can exercise his option to buy at anytime during the first 37 mo of the lease. Should he choose to buy the plane, the user will have already paid about 87% of the purchase price, including insurance and credit charges, at the end of the 48-mo rental period. The remaining 13% of the purchase price is paid off in small monthly payments.

Some Rent Planes

Some contractors avoid owning a plane by renting one, either for a single trip as the need arises or on a long-term lease. Rental organizations can be found at almost every airport. Some leases cover only the use of the plane and its insurance. Some supply a pilot and provide maintenance. Generally, rates are charged by the hour, but they vary greatly according to the type of plane, the size of the crew, the length of the lease, and other factors.

A new East Coast organization, Indair, Inc., of New York City intends to concentrate on serving contractor customers. The first thing Indair does is to evaluate the contractor's requirements. They do this by checking travel vouchers for the previous year, plotting proposed travel routes, determining the type of personnel that will use the craft, and estimating the number of hours a year the plane will fly.

Then Indair purchases the type of plane the contractor needs and leases it to him for a specific period of time. This may be for a year or for the length of time a contractor needs to complete a specific construction project. The plane and its crew are guaranteed to be at the disposal of the contractor at all times.

The advantages of this plan are that the contractor receives expert advice on the type of plane he needs; his maintenance, pilot fees, and insurance are covered under the lease contract; and, most important, the contractor knows his exact costs for a given period, and he can assign them to a particular project or group of jobs. Indair bills its clients monthly, according to the number of hours flown. These bills are pro-rated over the length of the contract.



AUTOMATIC LEVEL

Now you can get a reliable precision instrument, **WORKING 3 TIMES FASTER THAN A CONVENTIONAL LEVEL**—and... no complicated adjustments... no variations caused by changes in temperature!

F/S AUTOMATIC LEVEL 5173

FEATURES:

- 24X Periscopic Telescope
- Pendulum unit for self-leveling
- Viewing of bull's-eye level through telescope eyepiece

ERECT IMAGE

- Built-in Sunshade
- Sliding-leg Tripod with shifting head

18 MONTHS GUARANTEE
FULL SERVICING BY FACTORY
SPECIALISTS

ACCURACY: 0.025 ft. per mile

(can be improved to 0.010 ft./mile with Micrometer 5180—optional—allowing rod readings to 1/5000 ft. without targets)

PRICE OF AUTOMATIC LEVEL 5173—\$450 including metal case and tripod.

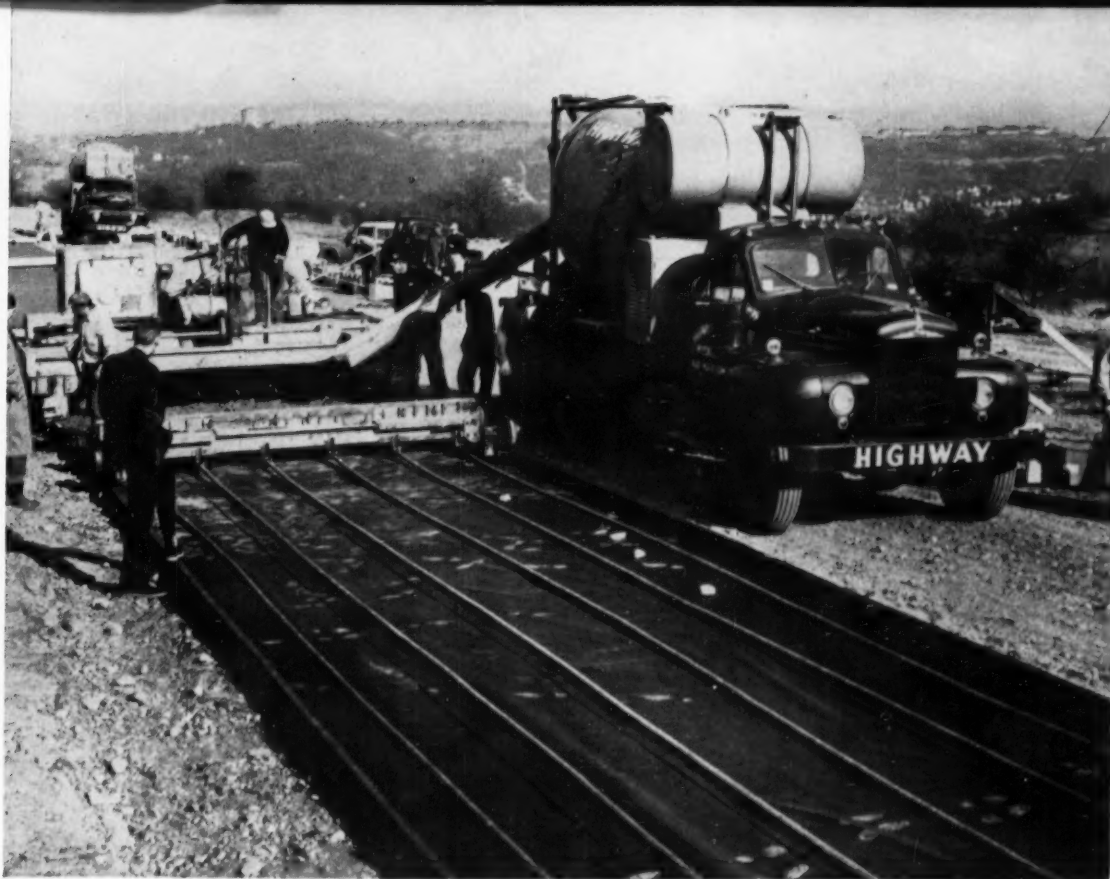
F/S DISTRIBUTORS: The A. Lietz Co., San Francisco & Los Angeles, Cal.—National Blue Print Co., Chicago, Ill.—J. E. Reagan Co., Denver, Colo.—Watts Instruments, Columbus, Ohio.

CANADA: Instruments 1951 Ltd.—Ottawa—Toronto—Regina—Montreal.

Send for further information

 **FILOTECNICA
SALMOIRAGHI INC.**

41-14 24th Street
Long Island City 1, N. Y.



SPECIAL DEVICE riding steel forms positions six prestressing conduits while ready-mix truck chutes concrete in front of Blaw-Knox

spreader. Each conduit contains four 7/16-in. seven-wire strands of cable. Tar paper on base cuts sliding friction.

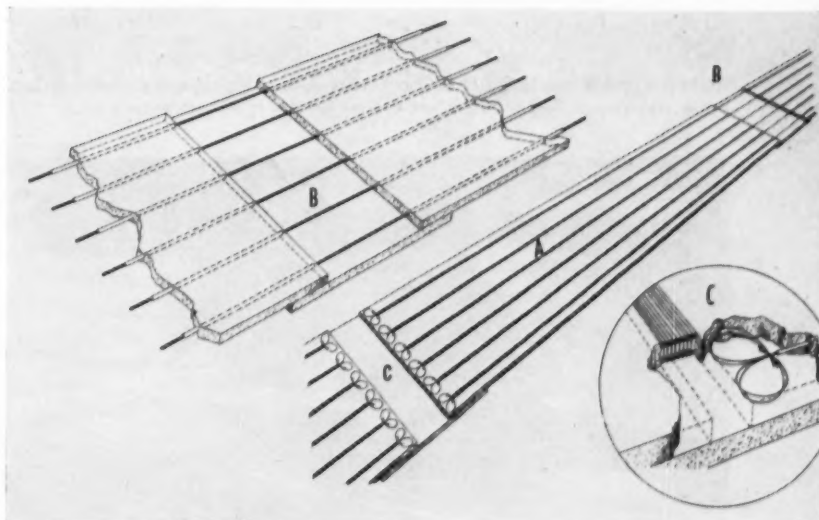
Now a Prestressed Highway

A BOLD EXPERIMENT now underway in Pittsburgh may mark the beginning of a new era in the development of prestressed concrete.

It's a 600-ft post-tensioned roadway slab built by Jones and Laughlin Steel Corp. Only 5-in. thick, it is prestressed with twenty-four 7/16-in. strands, four to a conduit.

The thin slab now is undergoing extensive load tests, and a preliminary report will be made later in the year. Savings in excavation and concrete are obvious; the test will show whether prestressing can maintain a crack-free slab under heavy pounding.

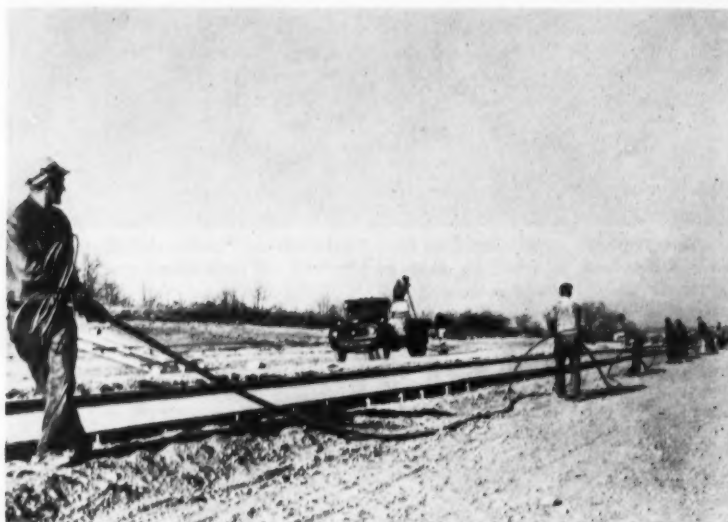
Basically, building the slab was simple. Specs called for six conduits of strand to be embedded in the slab at the neutral axis. At each end of the slab, strands were shaped into butterflies to anchor them in the concrete. A 6-ft gap



A. Prestress strands housed in flexible metal conduits extend full length of 400-ft slab, passing through 6-ft gap at center. They are anchored at opposite ends of slab by their butterfly-like hoops. **B.** Jacks placed in center gap push slabs apart, stretching strands and prestressing concrete. Straddling frame then is placed over gap to hold slabs apart while jacks are removed and gap filled with concrete. **C.** Special rubber-metal joint handles expansion between adjoining slabs.



FLEET of Caterpillar scrapers levels site near Jones & Laughlin plant. Selected subbase is topped with 1-in layer of sand to reduce slab's sliding friction.



WORKERS stretch long length of Duoflex conduit containing prestressing strands. Strands at gap are exposed. Rest of strands are pressure grouted to prevent corrosion.



STRAIN GAGES are imbedded in concrete at numerous points to record slab movements. Men in charge of testing are John E. Heinzerling and Dr. Charles F. Peck.

PRESTRESSED HIGHWAY . . . continued

was left in the center of the slab. In this gap, jacks were placed back to back. They pushed the two slabs simultaneously, forcing them to slide about 2 ft on the base, and stretching the strands. At proper elongation, a frame was placed at the gap to hold the slabs while the jacks were removed. The gap then was filled with concrete, and after 72 hr, the frame was removed and the slab achieved full prestress. To simulate large-scale conditions, one 400-ft section was prestressed between two 100-ft end sections.

Work was started late last year by Allegheny Contracting Industries on a 742-acre site in Pittsburgh. The strip was graded, compacted, and covered with a layer of selected subgrade. But before the roadway was laid, short support slabs were poured at the center and ends of the 400-ft strip. The center support slab was 10 ft long and 6 in. thick. It served to anchor the jacks at the gap in the roadway slab. Sleeper slabs at the ends were only 10 ft long, but they were required to support wide expansion joints. When these support slabs were completed, the granular subbase that would support the main roadway was covered with 1 in. of sand and a layer of tar paper to reduce sliding friction.

Meanwhile, the contractor fed strands into long Duoflex conduits. Supplied on reels, strands were pulled through the conduits by wires, and then played out at the ends in butterfly patterns.

When the conduits were laid between forms, the roadway was ready for paving. Ready-mix trucks chuted concrete in front of a Blaw-Knox spreader that distributed the mix across the slab. To position the conduits 2½ in. below the surface of the slab, the contractor mounted a wheeled frame with arms that held the conduits in front of the spreader.

Behind the spreader, concrete was leveled with a Blaw-Knox finisher and covered with Sisal-kraft curing paper. In 72 hr the slab was ready for stressing.

Inside the 6-ft gap, the contractor placed 10 Rodgers 150-ton jacks back to back and anchored them with collars to the supporting slab to prevent any movement. Designed and operated by Elgood Hydraulics Corp., the system was set up so that it could

OLIVER OC-4



The OC-46 is designed especially for loader service. The 46" gauge track is also longer to give the extra stability needed to use full power at all times. Full rotating bucket dumps to 8' 6" height. Jet-Trencher is attached or removed in only 90 seconds.

**"Right for the little jobs—
and around the big ones, too!"**



With 22 drawbar h.p. the OC-4 has an extremely wide range of usefulness—handles dozer, angleblade, scraper, scarifier, winch and other attachments.

The OC-4 is a winner wherever you use it. As a work horse on the little jobs, it travels quickly from one spot to another, handles a variety of assignments—loading, trenching, backfilling, grading, leveling—you name it! As handyman on the big projects, it keeps busy on cleanup work, eliminates expensive hand labor, frees larger equipment for heavier tasks—and saves money all along the line.

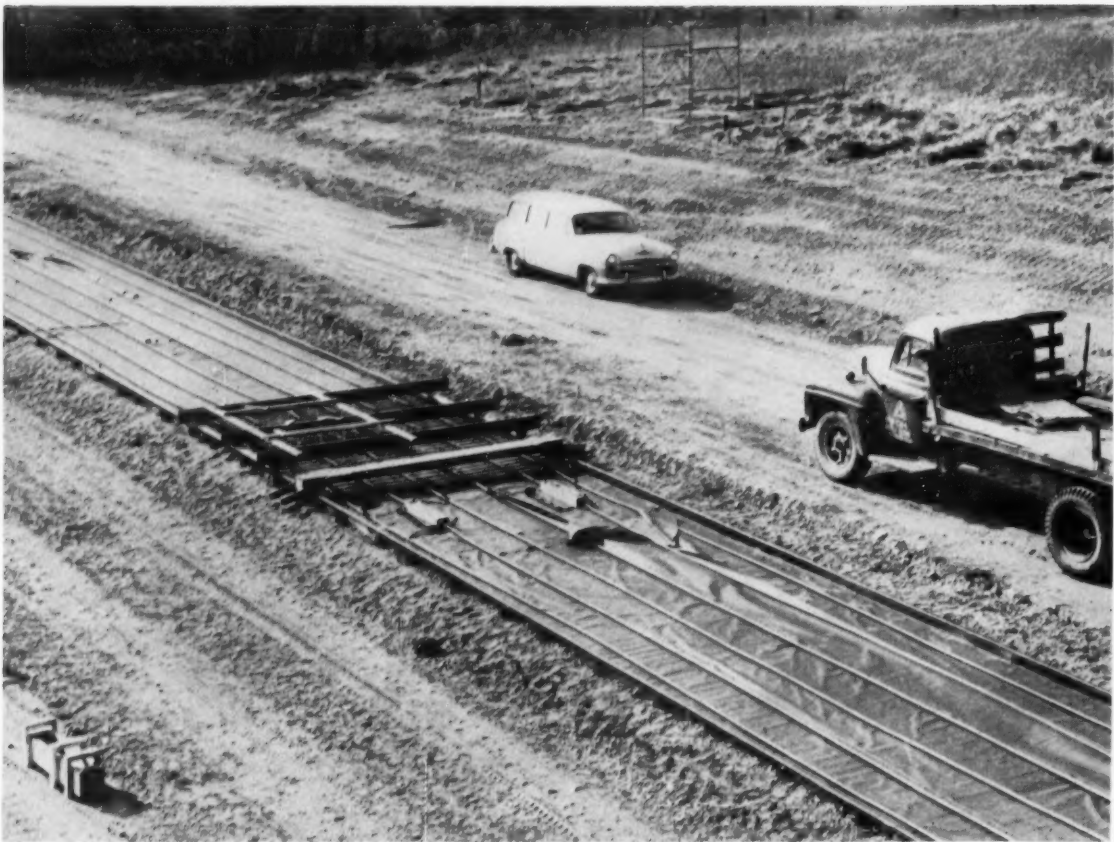
Here's new 4-speed transmission that gives you the power and speed to match every need. Here's smooth, easy handling that gets things done in a hurry. Here's the low price that means rock-bottom cost on every assignment. Let your Oliver distributor demonstrate it on your present job. Or ask us to send literature.



THE OLIVER CORPORATION

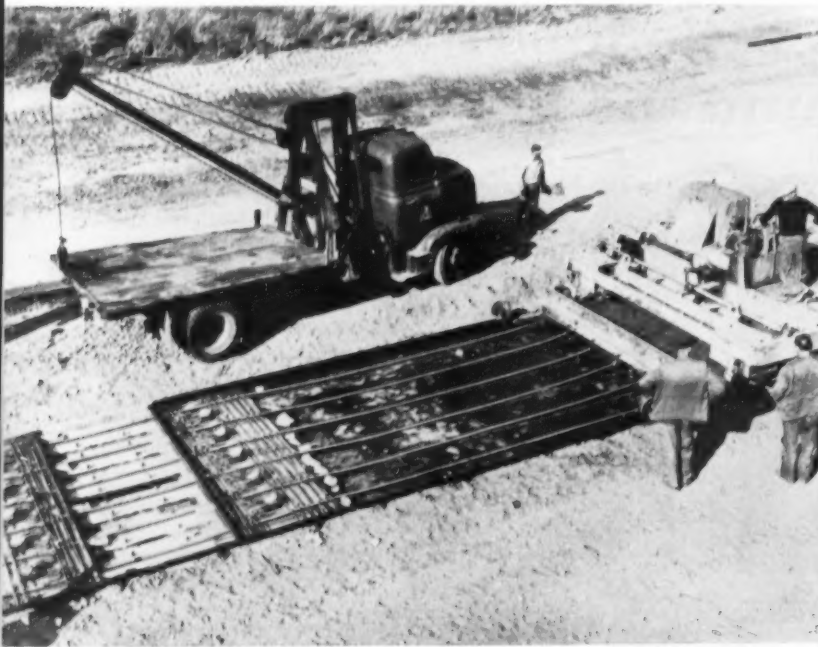
400 West Madison Street, Chicago 6, Illinois

a complete line of industrial wheel and crawler tractors and matched allied equipment



SMALL FRAME holds strain gages at slab quarter points before pour. Box-like units over conduits measure strand action. Extensive

test equipment is necessary to determine how slabs react during sliding. Results will govern future designs.



CONCRETE SPREADER approaches gap at center of slab. Cylindrical inserts on each side of gap form holes in which legs of straddling frame will be placed.

lock the load even if one line failed during jacking. Actually, three of the five pairs of jacks could continue to push the slabs if two were out of commission.

At full elongation of 24 in., line pressure was about 3,200 psi. The total maximum force to push the slabs was 240 tons.

When jacking was completed, a steel frame was set up to straddle the gap so that it could absorb the load and release the jacks. Special steel members with pipe-shaped legs were inserted in sockets in the slab and then assembled into a frame with cross piece and turnbuckles.

The jacks were removed, and the gap was filled with concrete. After 72 hr the frame was dismantled and removed, and the slab was prestressed. Grout then was pumped into strand conduits.

At the ends of the 400-ft strip, a wide expansion joint was necessary because of the long length of jointless roadway. B. F. Goodrich Co. designed a joint that is 12 in. wide and extends the full depth



GAGES record pressure on each of 10 jacks placed back to back in gap. System locks load in case of hydraulic line failure. Total maximum force required is 240 tons.



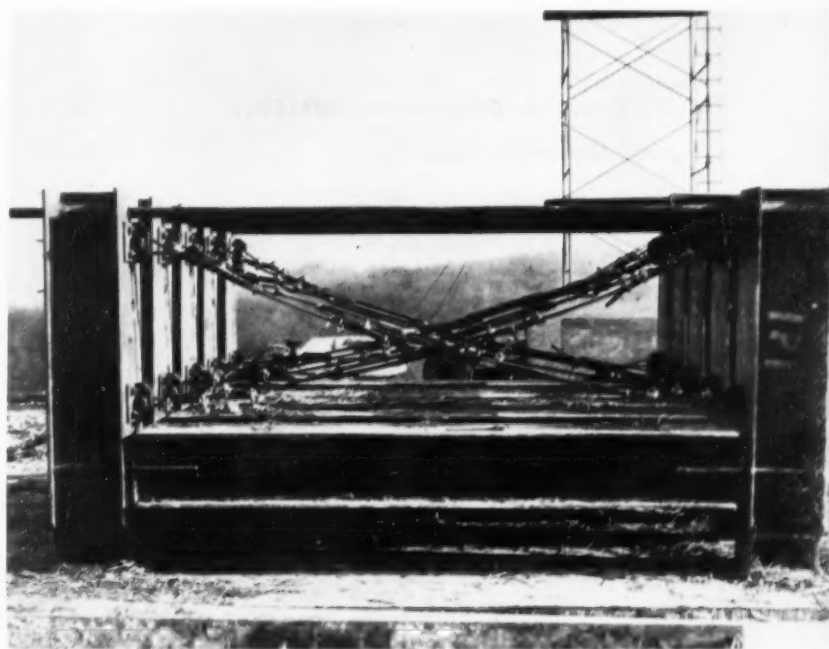
SECTIONS of steel frame are assembled over gap as jacks hold slabs.

of the slab, allowing the top surface to remain level at all times. It consists of metal plates bonded to rubber.

Naturally, many of the methods used in the test would be discarded or improved considerably on any large-scale prestressed highway work. The job probably would be broken into a number of separate operations performed by successive crews. Out in front, for instance, a fine grading crew would be followed by another group building anchorage and sleeper slabs. Strand already inserted in conduits also would be placed out in front. And jacking would be much simpler. Fewer jacks could probably do the job, and they would be carried in some type of jumbo.

The project is under the direction of J. F. Morris, director of product development. John J. Murray is development engineer.

Engineering work was done by the firm of Richardson, Gordon & Associates. Dave Camille was in charge for the contractor.




BIG STEEL FRAME straddles gap, filled with concrete after jacks are removed. It is dismantled 72 hr after pouring. Frame would be much simpler on large scale job.



This 125 cfm Gyro-Flo Compressor and PB-8 Paving Breaker combination is making short work of a heavy pavement job in a large Eastern city.

On any pavement job, you can **BREAK IT UP** and **FINISH IT UP**

in record time with this  **CONTRACTORS' COMBINATION**

1 An I-R GYRO-FLO COMPRESSOR of the right capacity

With the complete line of Gyro-Flo rotary compressors, there's no need to haul around or pay for any more air power than you actually need. Now available in 85, 125, 210, 315, 600 and 900 cfm sizes, you can pick a unit with the *right capacity* to operate as many or as few paving breakers as the job calls for. That means no idle compressor capacity — no overloading that cuts tool pressure and slows up the work. What's more, GYRO-FLO's *proved performance* assures a smooth, dependable air supply that's tops in fuel economy and remarkably free from attention or maintenance.

2 I-R PAVING BREAKERS of the right weight and power

Ingersoll-Rand offers you the most complete line of paving breakers and accessories available today. From the big, heavy-duty, 100-lb Breaker and Pile Driver to the lightweight 20-lb Demolition Tool and Digger — you can match the *tool* to the *job*. Use only the weight and power you need — reduce operator fatigue and save air power cost. In addition, I-R paving breaker steels and accessories, designed and built to stand up longer on the toughest jobs, are available for every breaking and demolition application.

Ask your I-R representative for the complete facts on this time-saving Contractors' Combination.

Ingersoll-Rand

11 Broadway, New York 4, N.Y. 14-502

THE BEST AIR EQUIPMENT FOR BETTER HIGHWAYS

Why this paving contractor bought his 4th BatchOmatic . . .

PLANT
NO.



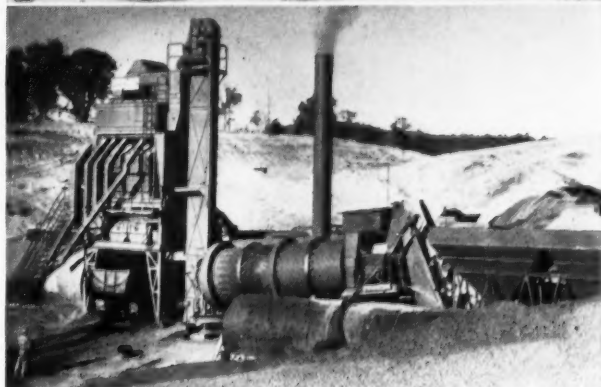
AUG.
'55



PLANT
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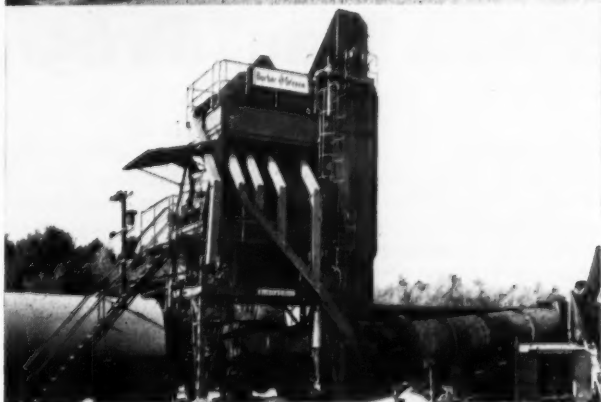
MAY
'56



PLANT
NO.



SEPT.
'56



PLANT
NO.



Plant No. 4, a Model 894, has just been shipped and will probably be in operation before this ad appears.

Literature on request.

Bayer and Mingolla had been in the asphalt paving business for many years before introduction of the BatchOmatic. During these years they had vast experience with many different makes of batch-plants, and they are thus ideally suited to judge the merits of the various plants available.

Record production. Bayer and Mingolla's first BatchOmatic is a 4000-lb. Model 894. It had turned out 145,000 tons (including 20,000 tons for the Mass. Turnpike) by October, 1956. Plant No. 3 with a 2000-lb. rated capacity has consistently produced as much as 84 tons per hour.

Record ease of erection. Although set up by a crew completely inexperienced with the BatchOmatic, Plant No. 1 was ready to produce just three days after erection started.

Record low repair costs. The second Model 894 BatchOmatic has produced more than 102,800 tons for turnpike and state work. Total repair costs for this tonnage amounted to \$200 or just 2/10ths of a cent per ton of mix produced. After producing more than 145,000 tons, Plant No. 1 is still using the original paddles and pugmill liners.

Exclusive features include:

Simultaneous weighing of all sizes of aggregate . . . eliminates the human element in achieving accuracy and maximum capacity.

Instant change-over from automatic to manual operation . . . provides mixes for the drive-in trade . . . instantly reset to preset repetitive cycle operation.

New Dyna-Mix pugmill . . . gives thorough coating in less time than any other pugmill.

Instant, positive inspection of aggregate gradation and weight.

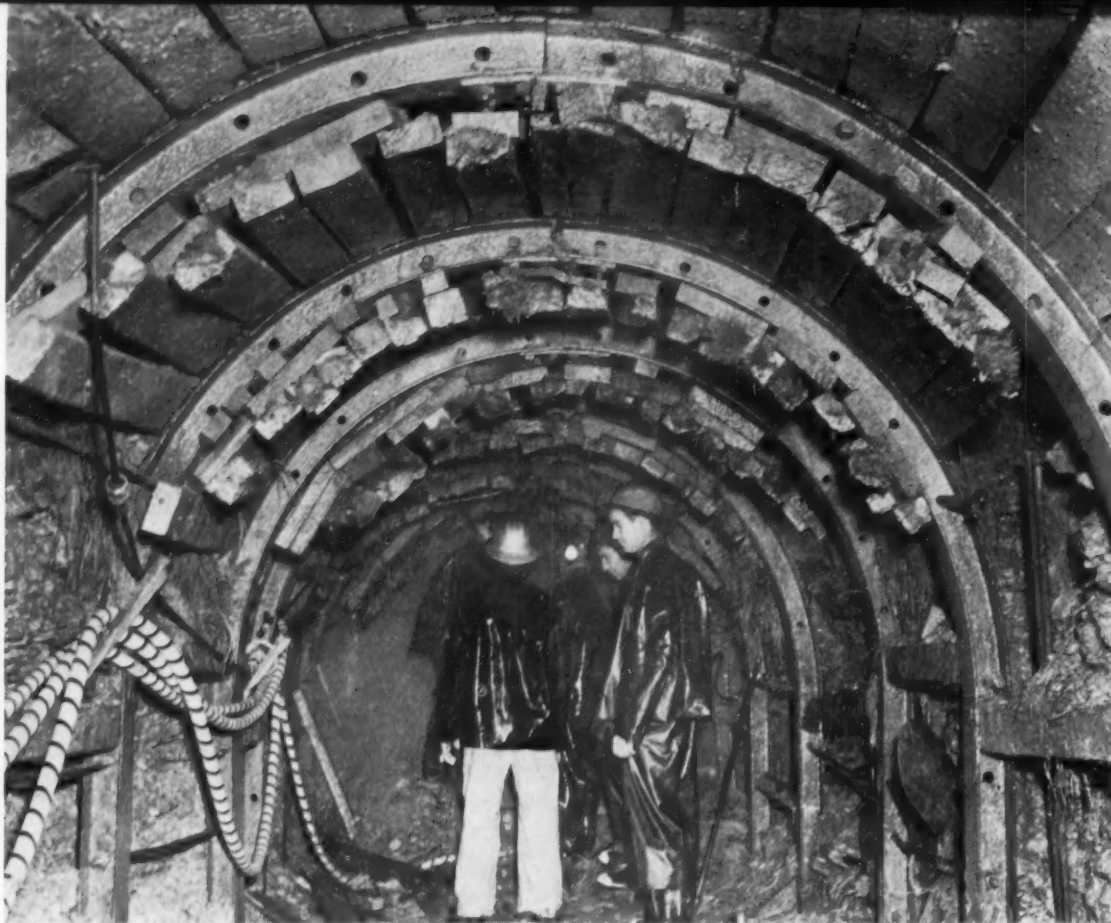
Barber-Greene

AURORA, ILLINOIS, U.S.A.



57-10-WB

CONVEYORS...LOADERS...DITCHERS...ASPHALT PAVING EQUIPMENT



POOR GROUND under right bank of Monongahela River must be supported by steel ribs advanced behind wood spiling. Mixed face is now tunneled under air.

Wet Conditions Limit Progress

CONSTRUCTION of Pittsburgh's vast new trunk sewer and treatment system is rapidly approaching the half-way mark. And it's been a tough struggle all the way.

The job is no bed of roses. There's a lot of water, an annoying amount of gas, ground that's worse than most contractors expected, a shortage of skilled miners, and pencil-sharp prices.

The \$100 million project is probably the biggest of its kind. It calls for a \$20-million treatment plant and 67 miles of intercepting pipelines ranging in size from 24 to 126 in. in dia. Half of the pipelines will be laid in tunnels; the other half, in open cuts.

Because of the abrasive character of the sewage in the area's combined sewer system, the Allegheny County Sanitary Authority requires that most of the pipelines be made of precast con-

crete pipe. They are cast in 16-ft lengths, using 7,000-lb concrete and corrosion-resistance Type 2 cement. Inside the tunnels pipelines must be backfilled with a minimum of 11½ in. of 3,000-lb concrete, made with Type 1 cement.

At present, only one tunnel contractor has holed through in enough places to lay any pipe, and he is just starting. The big push now is to drive the 33 mi of tunnel through a variety of ground, much of which is anything but good for fast progress.

Excavated bores range from about 7 to 13½ ft in dia. In some cases, a pipe as small as 3 ft in dia will be laid in a 7-ft dia bore, but that's the minimum bore in which muckers can operate.

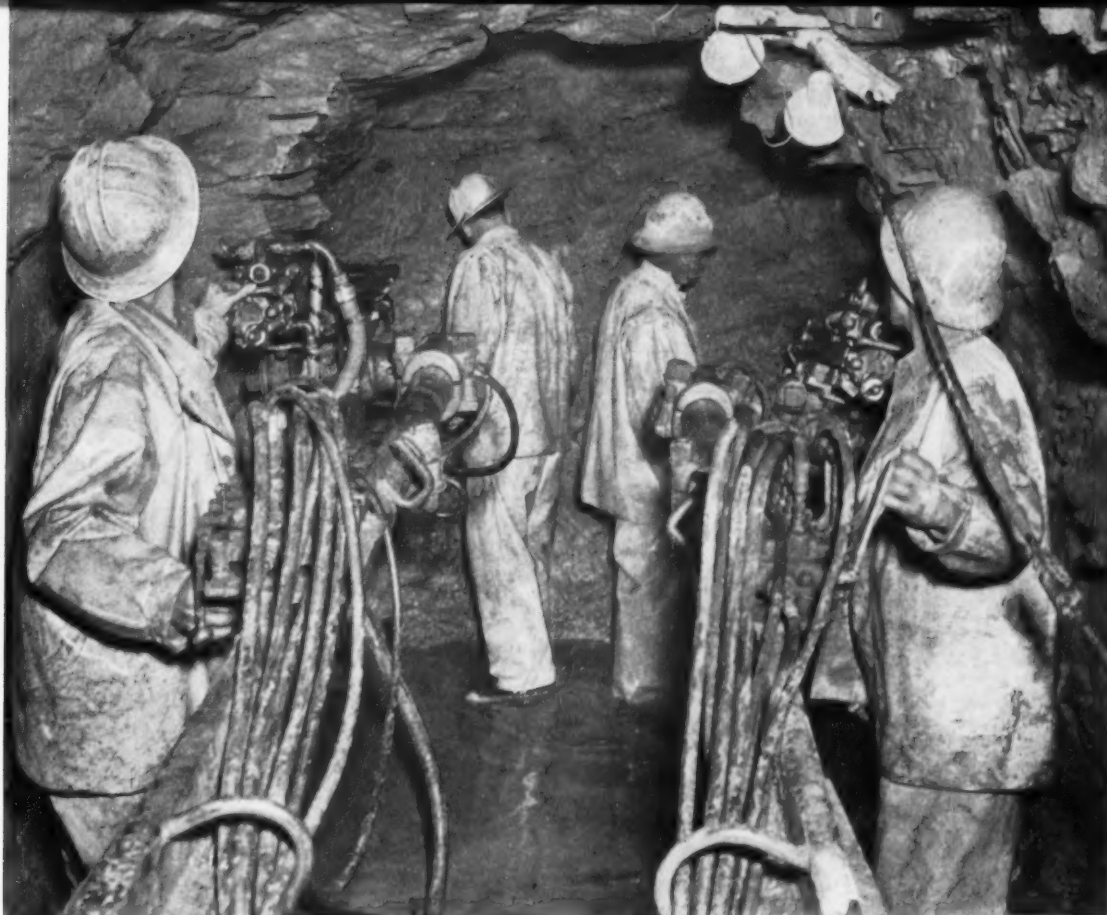
At some points, progress has been good for a substantial stretch. But these are few and

far between. Most contractors are getting only 30 to 35 ft a day per heading. And there are good reasons.

Water has plagued everybody. Every day contractors find themselves grouting in one heading or another. Seepage is so bad on one job that they pump well over 2,500,000 gal per day from a single shaft. All of the tunnels follow the edges of Pittsburgh's three big rivers.

Gas is another problem. If not detected in time, it can cause an explosion. And anytime the concentration reaches a dangerous level, all work must be halted for hours until the gas is exhausted.

Ground is mostly sandstone and shale. The trouble is that many tunnels run along the seam between the two materials. This not only produces plenty of water but also makes it tough to standard-



GOOD GROUND is attacked by pair of Gardner-Denver drifters mounted on fully hydraulic jumbo. Numerous wet seams require frequent grouting on all jobs.

on 33 Miles of Pittsburgh Tunnels

ize on drilling patterns and methods. And frequently a laminated rock overhead is loose and requires roof bolting or steel supports.

Several mixed faces of wet earth and rock also have been encountered. In some areas, it is so bad that timber spilling must be driven ahead to place each support rib. At one point, the contractor has gone under air, and he expects to need it for at least 4,000 ft.

The next big problem is labor. Skilled miners are short in the Pittsburgh area with such a vast amount of tunnel work under way at one time. Besides, the wage scale is not attractive enough to draw experienced men from many parts of the country.

Another serious problem is turnover. Sometimes if conditions get too rough in one tunnel,

men switch to another. Occasionally, men will move to an adjoining job when they've learned enough to bargain for a higher wage. One contractor lists only 300 to 400 men on the payroll, yet he has hired more than a thousand since the job began.

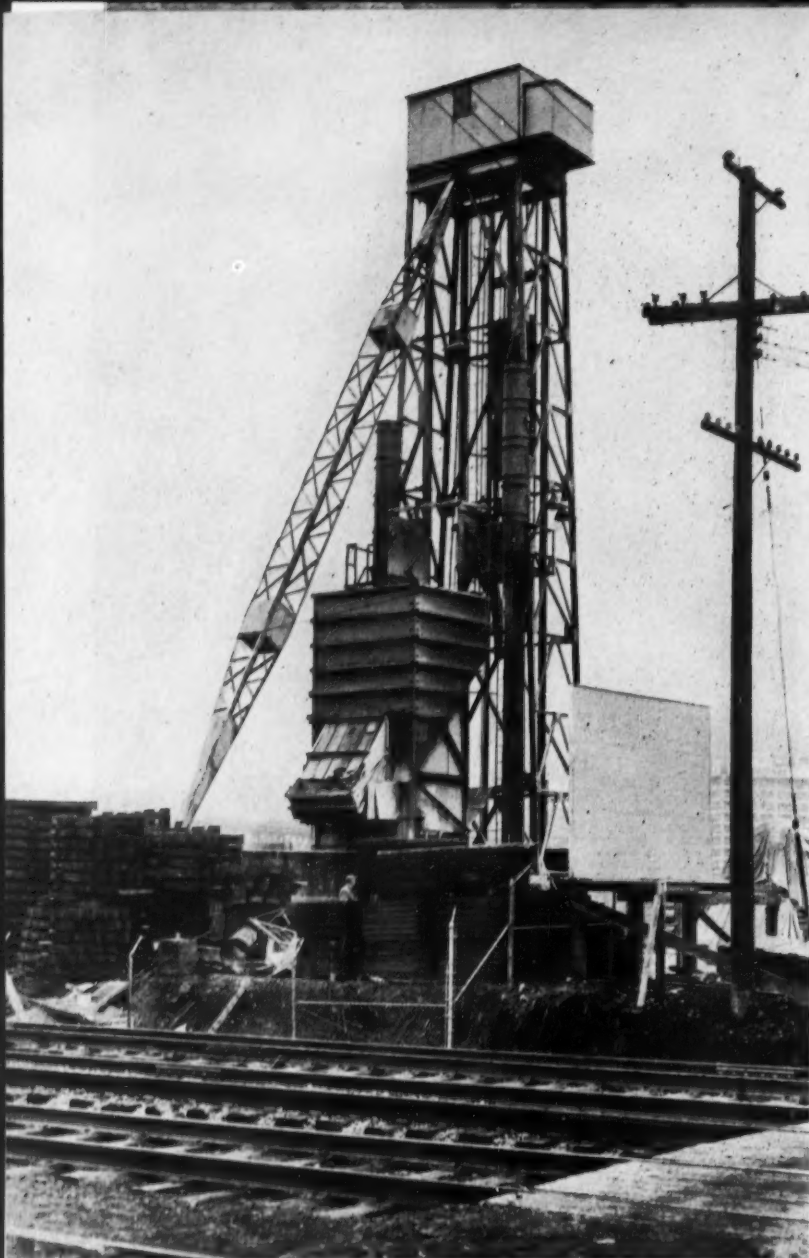
Bonuses Help

To combat turnover, some firms offer bonuses. And there are several types. Some pay for weekly footage that exceeds a quota; others permit Saturday work.

Lately, the turnover has reduced considerably. Men are getting accustomed to working on certain jobs, and they are sticking to them. How long it will last is problematical. The new Fort Pitt vehicular tunnel job will be hiring in the near future, and the County's sewer job will undoubtedly feel its effect.

Bulk of the tunnel work is being handled by four contractors. Dravo Corp. of Pittsburgh has two contracts totaling \$19 million, and Perini Corp. of Framingham, Mass., is working under one big \$12.2 million contract. About \$5 million worth of interceptor along the Allegheny River is under the direction of Harrison Construction Co. of Pittsburgh. But the biggest total is being handled by Mole Constructors, Inc., a joint-venture sponsored by Square Construction Co. of Baltimore. Including open-cut work, Mole has about \$22 million of work. And the Mole bids total nearly \$12 million under the total of the next lowest bidders. Project manager Vic Scaravelli has his work cut out for him. Yet, he's not worrying; his firm possesses a real talent for pushing a job.

continued on next page



TALL HEADFRAME with self-dumping skip features new friction-type hoist mounted on top. Note Joy Axivane blowers stacked on top of each ventilating pipe.

PITTSBURGH TUNNEL . . . continued

New Ideas Speed Men and Material Hoisting

Contractors attack their problems with a wide variety of methods. In fact, considering the similarity of the jobs, there is wide difference in approach.

Equipment for the 15 shafts on the project, for instance, ranges from simple crawler cranes to complex headframes and hoists. In shallow shafts, of course, lit-

tle is required except a crane. Muck buckets are hoisted one at a time and dumped at the surface. At other relatively shallow shafts, muck is hoisted in a self-dumping skip operated by a crane.

On the bigger and deeper shafts, steel headframes are preferred. Both Dravo and Harrison employ headframes that

operate the cage and skip in balance, with the hoist set up alongside at ground level. This requires large shafts, but both contractors need them because they eventually will have to handle some of the largest pipe sections.

Probably the most unique headframes on the project are installed by Perini at his shafts along the Monongahela River. They operate a skip-cage combination in balance with a counterweight. But the unusual feature is the Mayo hoist. It has no drum. Instead, it's a friction-drive type, relatively new to the United States but common in Europe. The hoist consists of multiple ropes reeved over a sheave, instead of one rope wrapped around a drum. It is operated by one man at the landing, with push-button control. The hoist is safe, simple, and efficient. Another advantage is that it can be mounted on top of the tall Mayo headframes, saving valuable working space at Perini's congested shaft locations.

Another unique shaft device is a man-lift operated in one of Mole's deep shafts. Housed in a liner-plate enclosure along one side of the shaft, the electrically powered lift simply is an endless vertical belt mounting small platforms and hand grips. It permits hoisting equipment to concentrate on material handling, greatly reducing the signaling problem. Some miners are reluctant to try the new device, but the contractor claims it actually is safer than conventional equipment.

continued on page 154



SUPERINTENDENT Angelo Schula steps on to man-lift at bottom of shaft.

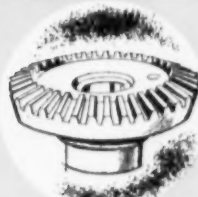
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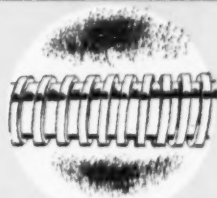
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HOLE for roof bolt is driven by LeRoi-Cleveland air-leg drill. Same unit also drives 7½-ft deep holes in face.



PIVOTING on frame of jumbo is Joy drifter for driving roof-bolt holes. Single unit can be adjusted to drill at any angle.

Variety of Rigs Handle Roof and Face Drilling

Drilling methods also vary considerably. They range from simple air-leg units working right from the ground to complex hydraulically operated jumbos.

Mole's 65,000 ft of tunnels are virtually all 7 ft in dia. And to

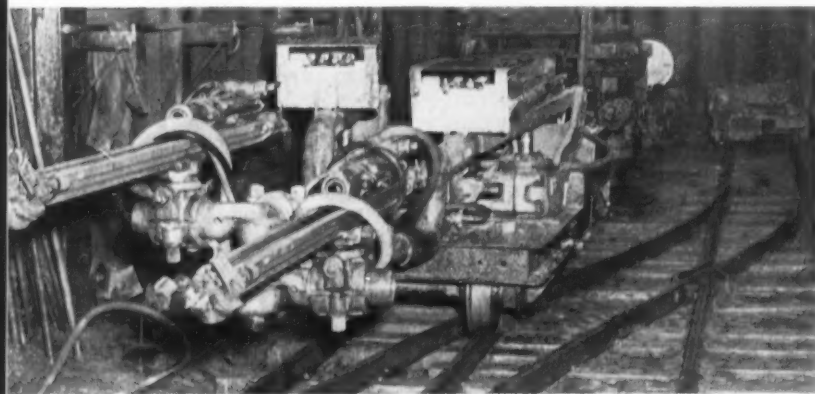
drive them they employ only three LeRoi-Cleveland air-leg drills in each heading. With one 8-ft length of drill steel, they sink about twenty-two 7-ft holes per round, and pull about 6½ ft. Where needed, roof bolts are

driven with the very same drills.

Production varies considerably, but in some headings, Mole has recorded the best footage on the project. Where conditions are good, the contractor has advanced better than 50 ft a day per heading. But his powder costs are high. With so many headings underway, it's difficult to maintain a close check on the type of rock at each heading and the efficiency of each drilling method. Besides, it's tough to get drillers to conserve on powder when they get a bonus for extra footage. Powder consumption averages better than 7 lb per cu yd of excavation.

Mole has the two extremes in tunneling conditions. Ground ranges from good solid rock to the worst kind of mixed face. At one point where the face was rock at the bottom and muck at the top the contractor had to drive timber spiling ahead to set each steel rib. Later, the muck became so bad that he was forced to build a bulkhead and continue under air. In this section, progress is about 24 ft a day.

Perini's 30,000 ft of tunnel will house pipes ranging in size from 66 to 90 in. in dia, which means a maximum excavated bore of



PAIR OF DRIFTERS on Gardner-Denver hydraulically operated jumbo handles drilling in most of Dravo's smaller tunnels. Flick of levers adjusts position of pivot arms.



SMOOTH circular bore is left by mining machine. Grooves cut in concentric-circle pattern are made by machine head to create lines of weakness for breaking rock.

about 10 ft. It's a continuous stretch of tunnel, attacked from three shafts.

Drilling is handled by three or four Joy drifters mounted on a hydraulically operated jumbo. They sink about 28 holes per shot, drilling 8 ft and pulling 7½ ft. Because of numerous delays caused by water and gas, progress has averaged about 35 ft a day per heading. And powder consumption is a high 7 lb per cu yd. Project manager Axel Swanson has experimented with a five-hole burn cut, but he expects now to try a king-size drill to sink a large-hole burn cut, somewhat similar to the pattern described last month in the article on New York's West Delaware Tunnel.

Perini drives roof bolts where needed with a Joy drifter mounted on a separate carriage from the jumbo. Its support frame permits the drifter to move transversely and to pivot, allowing it to drive at any angle.

Dravo Corp. has two big contracts along the Allegheny River. One job involves about 17,000 ft of 13½-ft bore, and the other has 37,000 ft of bore ranging from 7 to 10 ft in dia. Worked from two shafts, the smaller bore is drilled by two Gardner-Denver

drifters on a hydraulically operated jumbo. About twenty-five 8-ft holes are drilled per round, and they pull about 7 ft. A V-cut pattern with eight delays works well, producing an advance of about 40 ft a day per heading.

On the larger bores, Dravo operates a two-level, five drifter jumbo with working area on the back to support roof-bolt-driving stopers. Up to 45 holes are driven 10 ft deep in a modified wedge-cut pattern. Progress varies from 25 to 35 ft a day per heading.

Harrison has 11,000 ft of tunnel, most of which is the minimum 7-ft bore. Drilling is handled with a pair of Gardner-Denver drifters mounted on a hydraulically operated jumbo. Harrison's methods are based on short rounds. With one length of steel, they drill 5-ft holes and pull about 4 ft. It's a conventional 27-hole V-cut pattern, and their progress is about 30 ft a day per heading.

Mining Machines

Although excavation methods on the Pittsburgh project now are generally conventional, they were not always so. In the beginning, both Perini and Dravo invested heavily in experiments with min-



MIXED FACE is excavated by jackhammers as ribs and liner plates are advanced.

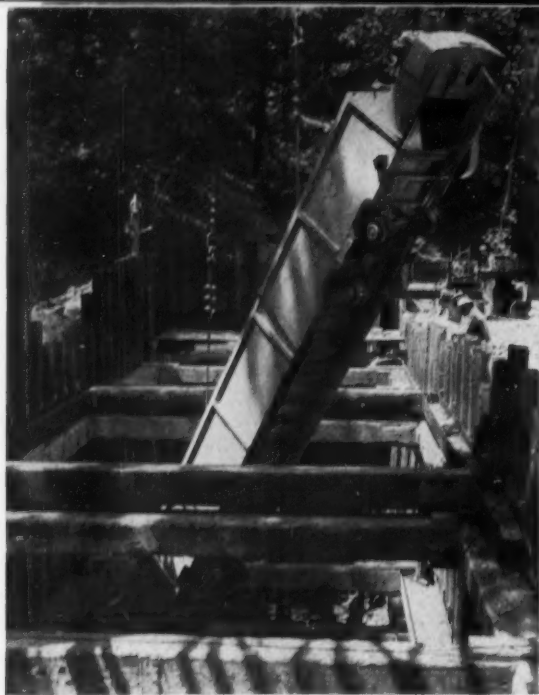
ing machines. But eventually, both contractors gave up and resumed drilling and blasting methods.

Made by Robbins & Associates of St. Paul, Minn., the mining machines actually bored several hundred feet of tunnel before they were removed. But the ground simply did not lend itself to machine mining. It was too variable. In short distances it would change from soft shale to hard sandstone and then back again. At other points, the face had both types of rock, which was equally difficult.

This was tough on bits, because it's nearly impossible to design a good cutting edge for two completely different materials. Water was another problem. Often it washed out the fines in the muck before they could be conveyed to the rear, and a slippery pile would build up under the rig and hamper progress.

There were other problems of maintenance, hydraulic control, and keeping on line. But when conditions were right, the rigs showed impressive progress. In fact, during one 2-hr period on Dravo's job a machine advanced 13 ft.

continued on next page



LONG CAR is lowered into shaft. Pulled by locomotive, it holds 13 yd of muck, eliminates time-consuming car switching.



MUCK is dumped into shuttle car by Eimco. Air powered belt in car bed slowly moves muck to rear and dumps it at shaft.

PITTSBURGH TUNNEL . . . continued

Shuttle Car Replaces Muck Train

Mucking methods are almost standard on the project. Nearly everyone employs Eimco air-powered units of several sizes. The 2-yd side-dump muck car also is common because it is the ideal size and works well at the muck pit at shaft bottom. Cars are hauled in trains either by diesel or battery locomotives. At the heading, cars are switched on passers.

The only radical departure in muck handling is an Irwin mine-type shuttle car employed by Dravo to replace the conventional muck car. The 40-ft long car holds 13 yd of muck and is loaded at one end by a conventional mucker. Its bed actually is an air-powered belt that slowly moves muck toward the rear end of the car as the mucker loads at the forward end.

Because of the weight of the shuttle car, the mucker is not coupled to it during loading. Instead, the locomotive is assigned the job of moving the car back and forth behind the mucker to assure fast loading.

This feature has good and bad points. When the mucker is digging for a heavier than normal load, for instance, it can use the counterweight action of a muck

car. But during cleanup operations, the mucker is better off without it.

Normally, on Dravo's small-bore section, a typical round is removed by three shuttle cars. When one is being loaded the others wait on a switch. There is considerable delay during car changes, but fast loading make up for this lost time. Besides, delays also would be unavoidable on a conventional setup with three 7-car muck trains.

Another advantage is the elimination of car passers and the enlarged areas to accommodate them. In tunnels requiring a lot of steel supports, building an enlarged area can be expensive.

The rig is pulled by a conventional locomotive, and it dumps simply by spilling muck off one end of the conveyor, through a hole in the car, and into the skip.

Auxiliary Equipment

Pumping, compressed air, and ventilating systems are simplified to some extent by the existence of numerous downshafts in each tunnel. Drilled from the surface, these 1 to 3-ft dia shafts will serve later to carry sewage from existing outfalls into the tunnel. But for now, they provide the

contractors with secondary shafts through which they can run a number of different utilities.

Most common ventilating rig is the Joy Axivane blower. Some contractors stack three or four of them right on top of the ventilating pipe at the shaft, others insert them every 1,500 ft in the tunnel pipe, and others use a combination system. They are simple to install, dismantle, and transport.

On the larger bores where ventilation requirements are high, large semi-permanent units are installed at the shaft.

Compressors range in size from 600-cfm portable units to permanent setups involving groups of 1,000-cfm compressors. Perini, for instance, installed five Joy 750-cfm skid-mounted compressors in each plant. Dravo's smaller bore is supplied by two Ingersoll-Rand units each with a capacity of 1,000 cfm.

Pumps are big items on Pittsburgh's wet tunnel jobs. Generally, contractors station a series of air-powered sump pumps along the tunnel to carry water back to the main shaft sump or to a down-shaft sump. On deep shafts, the high-head electric turbine pump is used almost exclusively.

continued on page 158



Cement Mixer Takes 60° Grade, one of many Four Wheel Drive tests. In all these grueling tests, Cities Service Lubricants make the grade and then some! They've done it for 20 years.



Early Four Wheel Drive Truck is one of vehicles in firm's museum. Founded in 1910, the company's first production amounted to 12 vehicles. Today, it is thousands yearly.

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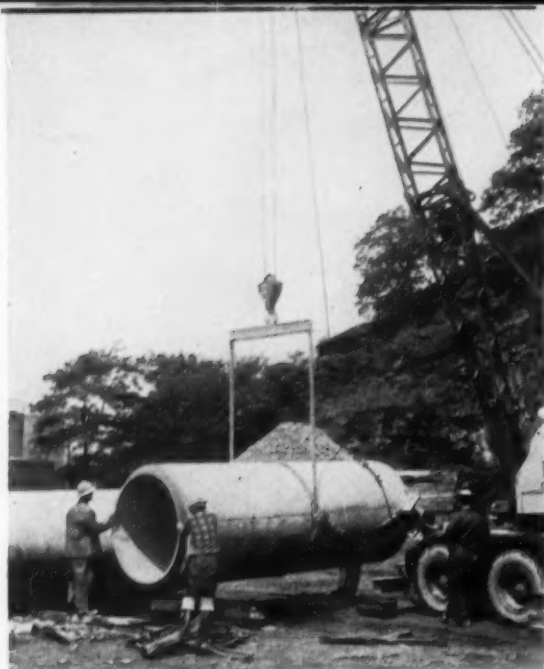
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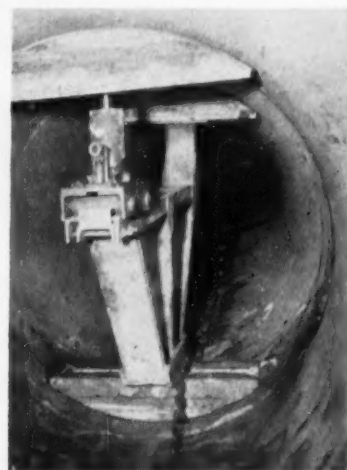
1. LIFTING DEVICE raises pipe and carries it to top of shaft. Bay City crane cable at heavier end keeps pipe horizontal.



2. CRANE upends pipe at top of shaft simply by slacking off on crane cable. End brackets take full 9-ton pipe load.



5. LOCOMOTIVE pushes pipe and dolly through tunnel on rails embedded in paved invert. Ventilating pipe is removed to provide headroom. Grout pipe is at left on floor.



6. JACK is mounted on frame cantilevered from previously placed section.

PITTSBURGH TUNNEL . . . continued

Pipes Go Down Shaft and Into Tunnel

Mole Constructors, Inc., is the only firm on the job that has holed through in enough tunnels to do any extensive pipe laying. And they've worked out some neat tricks to do it.

Handling the big 16-ft lengths of pipe on the surface is the first problem. Stockpiled horizontally, pipes must be carried to the top of the shaft, upended, lowered, returned to a horizontal position, and hauled through the tunnel.

Mole's answer is a simple steel

device handled by truck crane. Basically, its purpose is to maintain and control the position of the suspended pipe. It consists of a collar placed near the center of the pipe and connected to a pair of pivoting lifting bars. Connected both to the collar and the bars by cables is a pair of lifting brackets fitted on one pipe end.

Here's how it works. The lifting device, minus the lower half of the collar, is fitted over the pipe. The two brackets are

clamped to the end of the pipe, and the upper half of the collar is lowered on to the top of the pipe. Then the other half of the collar is fed underneath and bolted in place.

Before the pipe is lifted, the crane's second hoist line is tied to the heavier half of the pipe to keep it level when picked up. When the pipe has been moved to the shaft it is upended simply by letting out the second hoist line. As the pipe turns, the col-



3. PIPE is lowered into deep shaft, braced with steel liner plates. Enclosure at right houses novel electric man-lift.



4. DOLLY on tracks at bottom of shaft is in position as pipe is returned to horizontal by pulling from above on crane cable.



7. GROUT for backfilling around pipe is chuted into agitator, then fed into modified Gardner-Denver pump and pushed up to 2,500 ft through 4-in. pipe.

lar slips, and the heavy load is transferred automatically to the end brackets. The collar is built slightly loose so that the pipe hangs at an angle.

In this position, the big precast unit is lowered to the base of the shaft where the reverse procedure returns the pipe to a horizontal position and sets it on a dolly.

Placing is greatly simplified by first paving the tunnel invert with concrete and imbedding rails at exact grade. It has two advantages. The dolly rides smoothly to its destination, and the pipe is immediately placed at grade when it is lowered on to blocks.

To remove the dolly, the two ends of the pipe must be jacked

slightly. The end at the previously placed pipe is raised by a jack set on a cantilevered frame mounted inside the positioned pipe. The other end is raised by a semi-circular cradle with a small jack under each side. The pipe is pulled tightly into the joint with a come-a-long.

Backfilling

Mole's method of backfilling around the pipeline is unique. Normally, placers located either on the surface or in the tunnel pump concrete after a string of sections is laid.

But Mole is getting excellent results with a long-line grout system that permits simultaneous

placing, laying, and backfilling. Naturally, it's an expensive mix because of the high proportion of cement, but it requires few pieces of equipment and a small crew. It permits long-distance pumping.

Already, Mole has pumped backfill grout up to 2,500 ft through a 4-in. line, and they are developing a pump now that easily will handle 3,500 ft. Grout with a 6-in. slump is placed at the rate of about 15 cu yd per hr.

To permit simultaneous pipe laying and backfilling, Mole uses a bulkhead of dry-mixed bags of concrete. The grout pipe begins each backfilling operation at the previous bulkhead where the wet mix bonds with the bagged mix, resulting in a uniform backfill.

The grout pipe is retracted gradually as the mix surrounds the pipe and rolls forward, pushing any seepage in front. Grouting is continued until grout is forced out in front of the forward bulkhead, indicating a solid filling around the pipe.

During this operation, there is nothing to interfere with pipe laying. The pump is on the surface out of the way, and the grout pipe is small enough not to hamper other operations.

Men on the Job

In charge for Allegheny County Sanitary Authority is John F. Laboon with Lawrence Gentleman as deputy chief engineer and Richard Dougherty as chief construction engineer.



In estimating or laying out any earthmoving job, you must know ...

How to Compute Haul Distances

By S. C. GOFFINET, JR.,
Field Engineer
LeTourneau-Westinghouse Co.

EARTHMOVING contractors know there are many factors, some variable and some relatively constant, that affect production costs. And they know they must have a reasonably accurate method of assigning a value to these factors in order to arrive at a unit cost for moving the material. This article suggests a method for taking some of the guess work out of one of the variable factors—the haul distance.

Many earthmoving projects, particularly highways, are similar. Basically, it is a matter of removing the dirt from the high spots and depositing it in the low spots, making up for any deficit with borrow or waste. Many sizes and variations of earthmoving machines do this work, but the operating characteristics of all of them are relatively constant.

These machines travel within a fixed range of speeds. The load

time and the dump time for a given machine will not change a great deal from job to job. The cost of ownership and operation of any given machine will be about the same on every job. And the size of its load will not change very much. In short, the haul distance is one of the most important factors influencing the price of the dirt. And the importance of determining haul distances accurately is apparent.

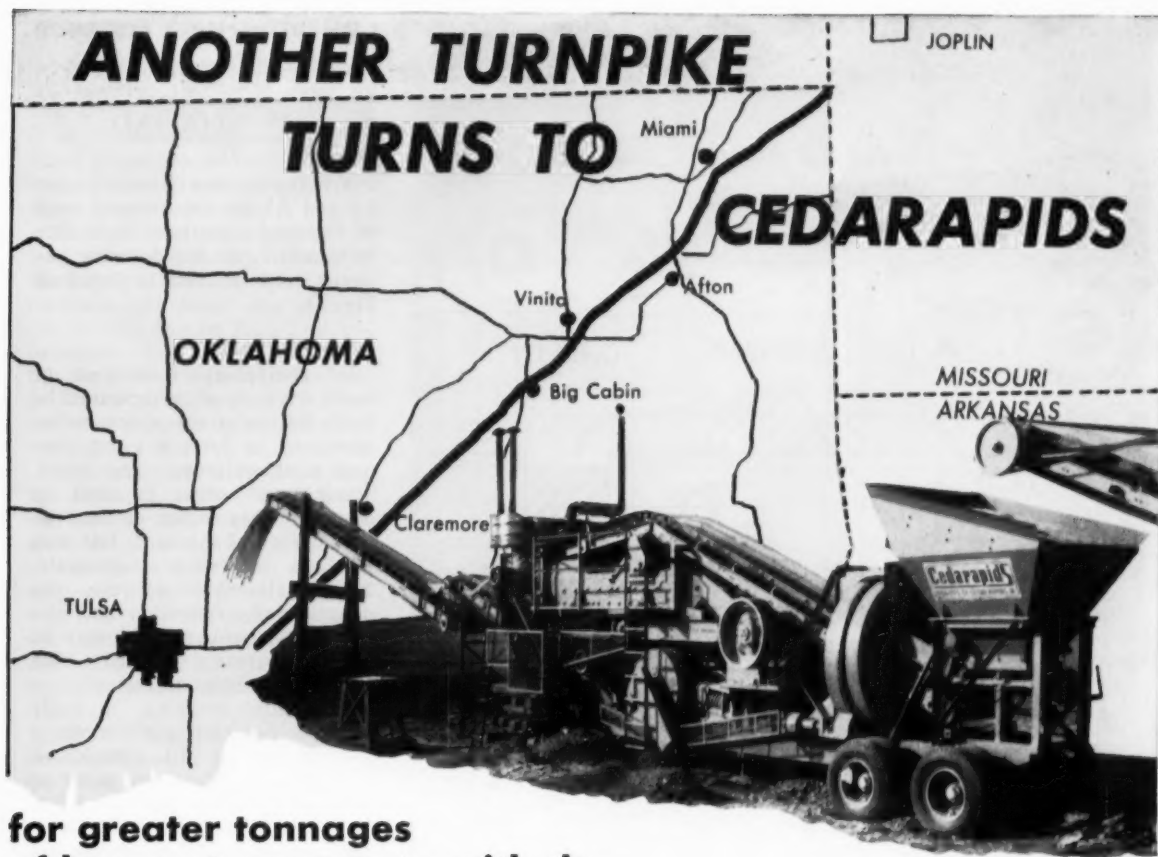
Use of the mass diagram is one method of computing haul distance. We have found that this method is more popular among engineers, contractors, and government agencies than any other. The construction and use of the mass diagram does not require knowledge of higher mathematics; only the ability to understand arithmetic is necessary. It is not 100% accurate, but it is probably the most accurate method known at the present time for

computing haul distances.

The mass diagram is a graphical representation of the volume of earth work and the haul distances involved in a given section of a survey. More technically, it is a curve or graph in which the horizontal distances represent the stations of the survey and the vertical distances represent the algebraic sum of excavation and embankment starting from some point of beginning on the profile.

To arrive at the figures needed to plot the mass diagram, we suggest the following method. First, consider the actual quantities of dirt involved. Quantities usually are determined by plotting cross sections at each station and at those substations where breaks occur in the natural surface of the ground. The areas of the cross sections may be determined by means of a planimeter, by geometrical means, or by a calculating machine. The U. S. Corps of Engineers uses the last method extensively, computing the volume of excavation and embank-

continued on page 162



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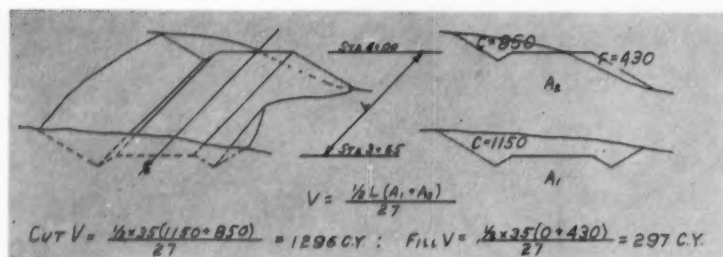


FIGURE 1

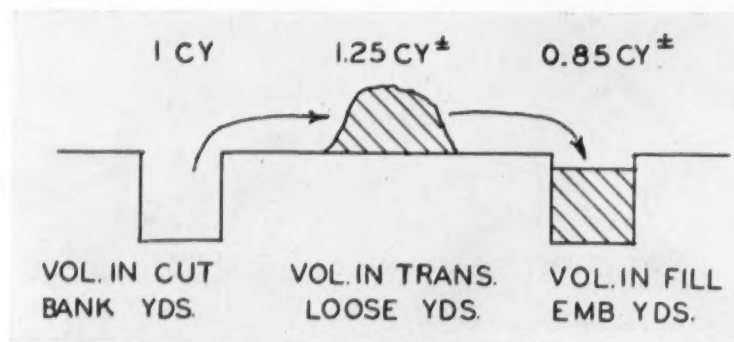


FIGURE 2

Sta.	End Areas		Ave. End Areas $\frac{1}{2}(A_1 + A_2)$		Dist. L	Vol. of Earthwork (L \times 27) \times Ave. End Area		Adj. Fill B.F. \times Col. 8 B.F. = 1.2	Alg. Sum Cut (+) Fill (-) Col. 7 + Col. 9	Cum. Tot. or Mass Diag. Ordinate
	Cut	Fill	Cut	Fill		Cut	Fill			
0+00	0	0				(+)		(-)		0
1+00	975	0	488		100	1807			+1807	+ 1,807
2+00	1690	0	1333		100	4937			+4937	+ 6,744
3+00	2125	0	1908		100	7066			+7066	+13,810
3+65	1150	0	1638		65	3943			+3943	+17,753
4+00	850	430	1000	215	35	1296	279	335	+ 961	+18,714
5+00	72	1240	461	835	100	1707	3093	3712	-2005	+16,709
6+00	0	1954	36	1597	100	133	5915	7098	-6965	+ 9,744
7+00	0	2186		2070	100		7666	9199	-9199	+ 545
8+00	0	1500		1843	100		6826	8191	-8191	- 7,646
9+00	75	240	38	870	100	141	3222	3866	-3725	-11,371
10+00	785	75	430	158	100	1593	585	702	+ 891	-10,480
11+00	1120	0	953	38	100	3530	141	169	+3361	- 7,119
12+00	1600	0	1360		100	5037			+5037	- 2,089
13+00	719	0	1160		100	4296			+4296	+ 2,211
13+73.25	0	0	360		73.25	977			+ 977	+ 3,188

FIGURE 3

COMPUTING HAUL DISTANCE...

ment by this average end area formula:

$$V = \frac{1}{2} L (A_1 + A_2) \div 27$$

V is the volume in cubic yards; A1 and A2 are the areas of each of the cross sections in square feet; and L is the distance between cross sections in feet (see Fig. 1).

Balance Factor

In computing quantities of earth work, an allowance must be made for the excess of excavation necessary to form a given embankment volume. The word, "shrinkage," often is used to designate this excess of excavation over embankment, but this term is somewhat inadequate. The relationship between the quantity of excavation and the quantity of embankment may be more accurately termed, "the earth work balance factor."

Generally speaking, a cubic yard to cut just won't make a cubic yard of fill. Rock, of course, is the exception. Some of the dirt is blown away and lost on the haul; some of it is washed away by rain; and modern compaction equipment packs it in the ground a little tighter than Mother Nature put it in the cut area.

This relationship between the volume of cut and fill should not be confused with the relationship between cut (sometimes called bank yardage or pay yardage) and the loose volume that is hauled on the earthmoving equipment.

Fig. 2 shows all three of these relationships. The usual range of the balance factor is from 1.15 to 1.25. This usually is given somewhere in the plans and specifications. The balance factor is applied to the fill. In other words, we increase the volume of fill by an amount necessary to determine the yardage of cut or embankment needed to make the fill.

Sometimes this volumetric change is handled by applying a shrinkage factor to the cut. But many engineers prefer to change the fill volume rather than the cut volume so we will outline the balance factor procedure here. The two methods give about the same results.

Fig. 3 is a suggested format for recording, accumulating, and tab-

continued

ulating the information necessary for plotting the mass diagram. Fig. 4 is a profile of a center line of a survey with the mass diagram projected under it. This mass diagram was plotted from the information in Fig. 3.

In Fig. 3, column 1 lists the stations corresponding to those of the survey. Columns 2 and 3 are measure end areas, one column for cut and one for fill. This information may be obtained by the methods we have described, or it may be taken directly from the cross sections that accompany the plans.

Columns 4 and 5 are the average end areas, computed by adding together two consecutive end areas in columns 2 and 3 and dividing by two. Column 6 is the distance between cross sections—usually 100 ft except where cross sections have been taken at substations because of abrupt changes in the natural terrain, etc.

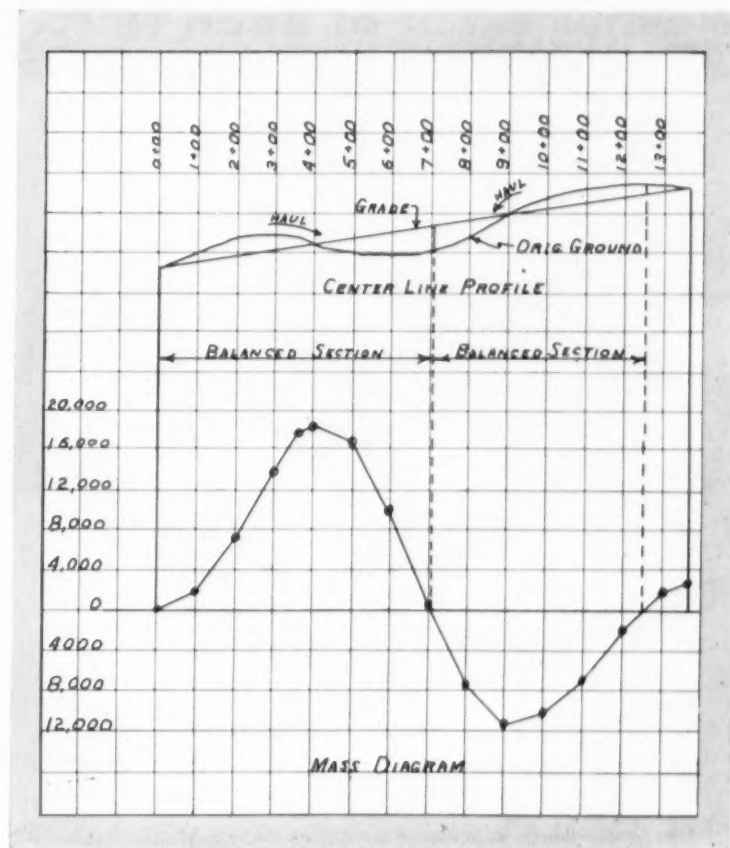
Columns 7 and 8 are the computed volumes of cut and fill respectively, arrived at by multiplying the values in columns 4 and 5 by the values in column 6 and dividing by 27. Column 9 is the adjusted fill volume, taking into consideration the balance factor. In this example, we use a value of 1.2 for the balance factor. Column 8 multiplied by 1.2 gives the values for column 9.

Column 10 is the algebraic summation of the cut and fill volume. We arbitrarily assigned cut values as positive and fill as negative. Column 11 is the accumulative total of column 10. It is sometimes called the mass diagram ordinate. We use these values to plot the mass diagram.

In Fig. 4 we have plotted the values from column 11 above or below the corresponding stations on the base line (plus values above the line, and minus below). Points are connected either by a straight line or a smooth, continuous curve; either way gives about the same degree of accuracy.

Where there are both cut and fill at the same station, we have used the excess of one over the other to compute the mass diagram ordinate. In this instance, the fill is made from the excavation at the same station, the material being moved at right angles to the center line of the highway, or "crosshauling."

Also in the case where both cut



and fill occur between two consecutive stations, the fill is made first with the cut from the same section and usually is treated as crosshaul. The remaining cut material, if any, then becomes longitudinal haul.

Because the ordinates to a mass curve are plotted from cut volumes and fill volumes (fill plus allowance for shrinkage), the cut and fill between the points at which any horizontal line cuts off a loop of the mass curve will exactly balance. Such lines are called "balancing lines." In Fig. 4 we use the base line as a balancing line, and we can see at a glance that we have a balanced condition between Station 0+00 and Station 7+10; there is exactly enough excavation between these two stations to completely fill all the embankment volume between them.

The same condition exists between Station 7+10 and Station 12+50. From Station 12+50 to the end of the project, we have a surplus of excavation that must be wasted. In Fig. 4 we project these balance points up to the

centerline profile and put in arrows indicating the direction of haul.

Now, we must go back to Fig. 3 and add all the values in column 7 (volume of earthwork, cut) from Station 0+00 to Station 7+10. We find that there are 20,889 cu yd of excavation between these two stations.

Next, we add all the plus values in column 10 (algebraic sum) between these two stations and find that the total volume of excavation that must be hauled longitudinally (parallel to the centerline) is 18,717 cu yd.

In this example, the longitudinal haul volume is exactly equal to the maximum ordinate in column 11 for this balanced section. This is always true when the mass diagram has only one crest or peak between balance points. When there are two or more crests between balance points, the volume of material hauled longitudinally will be greater than the maximum ordinate in that section.

The difference between the total volume of excavation (20,889

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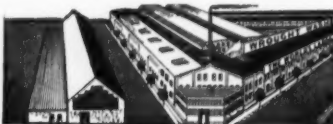
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COMPUTING HAUL DISTANCE ... continued

cu yd) and the volume of longitudinal haul (18,714 cu yd) is the volume of crosshaul. Most contractors treat this as dozer work.

The average distance that the 18,714 cu yd must be hauled is equal to the area between the balance line and the mass diagram divided by this same 18,714 cu yd. This area can be found by a planimeter, by geometry, or simply by counting squares when the mass diagram is put on graph paper.

We used the easiest — and least accurate — method, counting squares. There are 17 squares in the loop of the mass diagram between Station 0+00 and Station 7+10. Each of these squares is 100 ft long by 4,000 cu yd high so its area is 400,000 cu yd ft. (A cu yd ft is a fourth dimensional quantity with no significance for this problem.)

The total area under the 17 squares then is 6,800,000 cu yd ft. Divide this by the volume of the longitudinal haul — 18,714 cu yd. The cu yd cancel out to give an answer of 363 ft, the average distance the cut material must be hauled to make the fill.

So we have learned that between Station 0+00 and Station 7+10 we have a balanced condition with a total of 20,889 cu yd of excavation of which 18,714 cu yd must be hauled an average distance of 363 ft. The remaining 2,175 cu yd is crosshaul.

By the same procedure we find that between Station 7+10 and Station 12+50 we have another balanced condition with a total of 12,434 cu yd of excavation of which 11,371 cu yd must be hauled 335 ft and the remaining 1,063 cu yd is crosshaul.

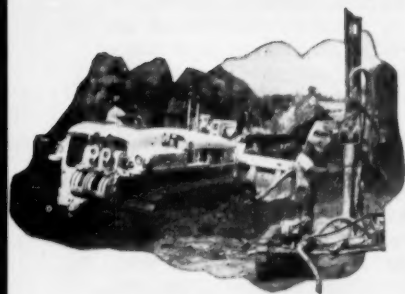
From Station 12+50 to the end of the project we have 3,188 cu yd of excavation that is excess and will be hauled to a waste area.

Overhaul

Quite often contract prices are based on a maximum length of haul — generally 500 ft — called the free haul distance. If the material is transported a longer distance, the extra work involved is called overhaul, and the contractor is allowed extra compensation at a certain price per station yard. (A station yard is 1 cu yd of excavation hauled 100 ft.)

continued on page 166

Here's why Euclid TC-12 Twin-Power Crawlers give you MORE WORK-ABILITY



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The TC-12 has speed—up to 7.8 mph forward or reverse—but that's not all. Pivot turns (one track forward and one reverse at the same time) plus changing of direction and range under full power without loss of momentum save considerable time during the tractor's daily operation.

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Two engines with a total of 436 h.p. (413 net h.p. at drive train) make this Euclid "Twin" the world's most powerful crawler. Being more powerful, the TC-12 offers additional benefits, such as faster work and longer engine life, since the engine often operates at less than full capacity without strain. And, the reserve power permits handling the toughest tractor job.

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Pivot turns with the TC-12 take less space and time. Changing directions on the go with Torqmatic Drives makes maneuvering into position quicker. Split-half construction gives better traction on uneven ground.

EASY OPERATION

Clutching and shifting are eliminated with the TC-12 "Twin". There's 24-volt push-button starting and instant response to directional levers, range selector and hand throttle levers, all of which are conveniently located to allow complete freedom of the operator's right hand for control of attachments.

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Many design features contribute to long life and easy servicing. Location of radiator behind operator reduces damage and improves cooling. Track tensioning and recoil system are automatic. All engine accessories are readily accessible from outside the engine compartment. Rollers can be removed without breaking track. Engines, Torqmatic Drives, and planetary final drives can be removed without disturbing the other components.

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COMPUTING HAUL DISTANCE . . . continued

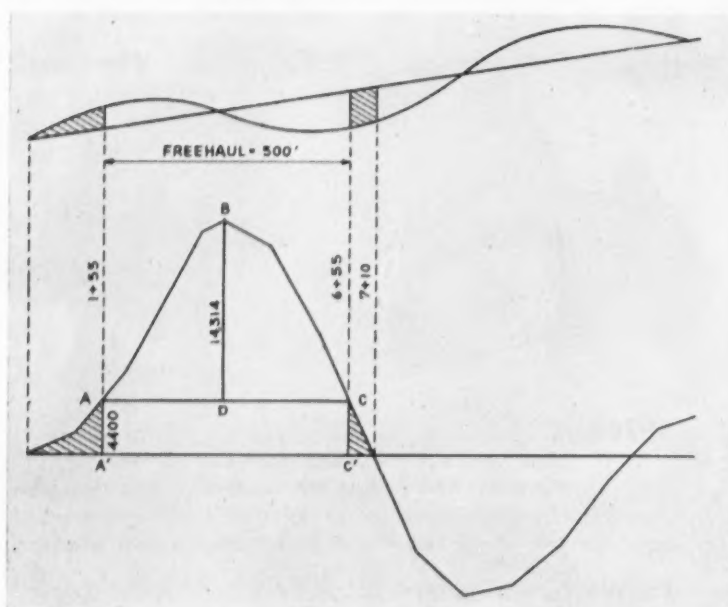


FIGURE 5

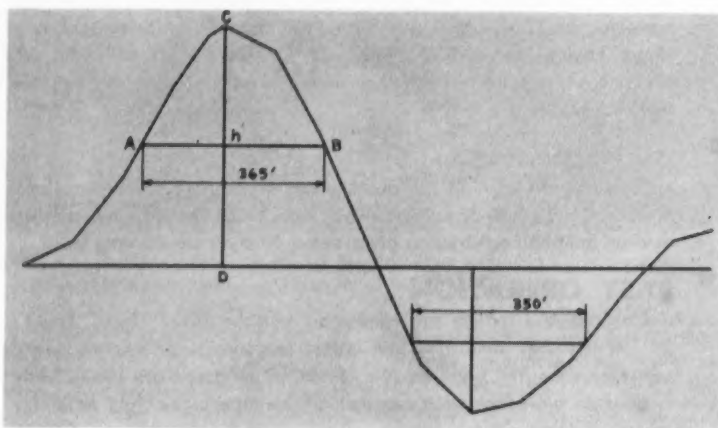


FIGURE 6

So the contractor is paid for all excavation and for overhaul, but he is not paid for making the fills or for haul inside the free haul distance.

Now it is obvious that the amount of work to be done on a given project will be the same regardless of the method of payment or the type of form for the bid proposal. The total volume of dirt to be hauled will be the same whether we think of it in terms of free haul and overhaul yardage or in terms of the unit cost for the whole project. But it is essential for the contractor to have a working knowledge of this free haul and overhaul basis of payment so that he can submit his bids in the proper form when the occasion calls for it.

To compute overhaul, we use the same mass diagram (Fig. 5) we previously drew up. Allowing a free haul distance of 500 ft, overhaul is determined as follows:

The line AC is drawn parallel to the base line of the mass diagram so that it is 500 ft long to scale. We then project the lines AA' and CC'. Points A and A' are at Station 1+55, and points C and C' are at Station 6+55.

The line AA' or the CC' is a measure of the overhaul yardage. In this case, they scale 4,400 cu yd. That tells us that in our balanced section between Station 0+00 and Station 7+10 we have 4,400 cu yd that must be moved some distance greater than 500 ft.

This additional distance is called the average overhaul dis-

tance and is computed in much the same way we figured haul distances. That is, we divide the appropriate area on the mass diagram by the ordinate that represents the volume of material to be moved. In this case, we compute the sum of the shaded areas at the bottom of Fig. 5 by any of the methods previously suggested and find that it comes out to about 381,000 cu yd ft. Then we divide this by the ordinate AA', or 4,400 cu yd. That gives us 86.59 ft for the average overhaul distance.

The average haul distance of the excavation from Station 0+00 to Station 1+55 to make the embankment between Station 6+55 and Station 7+10 is the average overhaul distance plus the free haul distance or 587 ft. The overhaul is equal to the volume of material multiplied by its average overhaul distance in stations: 4,400 cu yd \times 0.8659 stations = 3,810 station yards.

Station Yards

If you are interested only in station yards and not the distances involved, you can arrive at the answer more directly by simply dividing the area from the mass diagram by 100. For example, we had an area of 381,000 cu yd ft. Divide this by 100 (ft per station). The feet cancel out, and we get 3,810 station yards.

Our figures so far tell us that we have a total of 18,714 cu yd of material to be transported longitudinally between Station 0+00 and Station 7+10. And we have decided to call 4,400 cu yd of this total overhaul yardage. So the remaining 14,314 cu yd is the free haul yardage. This is represented by the ordinate BD (Fig. 5).

The average haul distance of this free haul yardage is computed by dividing the area enclosed by the balancing line AC and the mass curve by the ordinate BD. This gives us 296 ft.

So this balanced section can be described as 14,314 cu yd of free haul and 3,810 station yards of overhaul. For estimating purposes, we have 14,314 cu yd that must be moved 296 ft, 3,810 cu yd that must be moved 587 ft, and 2,175 cu yd of crosshaul.

We have now analyzed the same section by two different methods. Our results have been approximately the same, but we have stated them differently. Some engineers and estimators use still

COMPUTING HAUL DISTANCE

continued

another method of computing haul distances. The accuracy of this method for detailed estimating purposes is questionable, but it can serve as a quick, easy check on your arithmetic when you use the methods we have described.

Essentially this is a graphic method that consists of drawing a line parallel to the base line through the midpoint of the ordinate that represents the volume of material to be moved. The average haul distance is represented by the length of this line between the two points where it intersects the mass curve.

This method can be applied on any balanced section when the mass curve has only one crest between the balance points.

In Fig. 6 is an example of this procedure with the same mass diagram we drew up before. In the first balanced section, the line CD is the maximum ordinate. We locate point "h" midway between C and D and draw line AB through it parallel to the base line. The scaled distance between A and B is then the average haul distance. In this case, it scales 365 ft, approximately the same as the 363 ft we calculated by the other methods. In the same way, we find that the scaled haul distance in the second balanced section is 350 ft. That's not too close to the 335 ft we previously calculated.

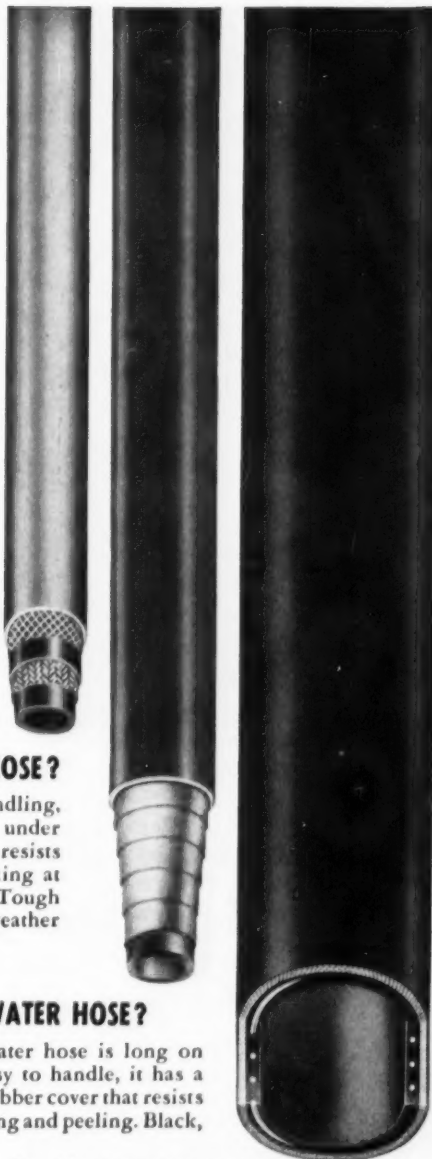
We have not by any means covered all the uses of the mass diagram in this article. Some of the applications you may wish to investigate further are economic haul distances, the use of balance lines other than the base line, and the conditions under which it is advisable to waste material and then subsequently borrow rather than use all the excavation on a given project.

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Job-Built Platform Guides Steel Sheeting



WORKS A GOOD CURVE—Driving of sheeting on curved sections of trench bracing is done easily with curved plywood attached to platform. Platform is moved ahead manually.

A **JOB-BUILT** wood platform guides lightweight steel sheet piling for trenches with ease and accuracy even along curved trench sections.

A. J. Ellis Construction Co. uses such a platform for construction of an extension to a power station for the Potomac Electric Power Co. near Washington, D. C.

Part of the \$50,000 project involves laying 6-in. steel pipe for electric cables in six trenches. Each trench varies in depth from 7 to 16 ft, and much of the trenching is curved. Handling and aligning the sheeting accurately in these curved sections—because of variances in depth—is solved with the platform.

Made from scrap 2x4's, the platform measures 6 ft high, 6 ft long, and 3 ft wide. The frame is covered with plywood. This is how it is used.

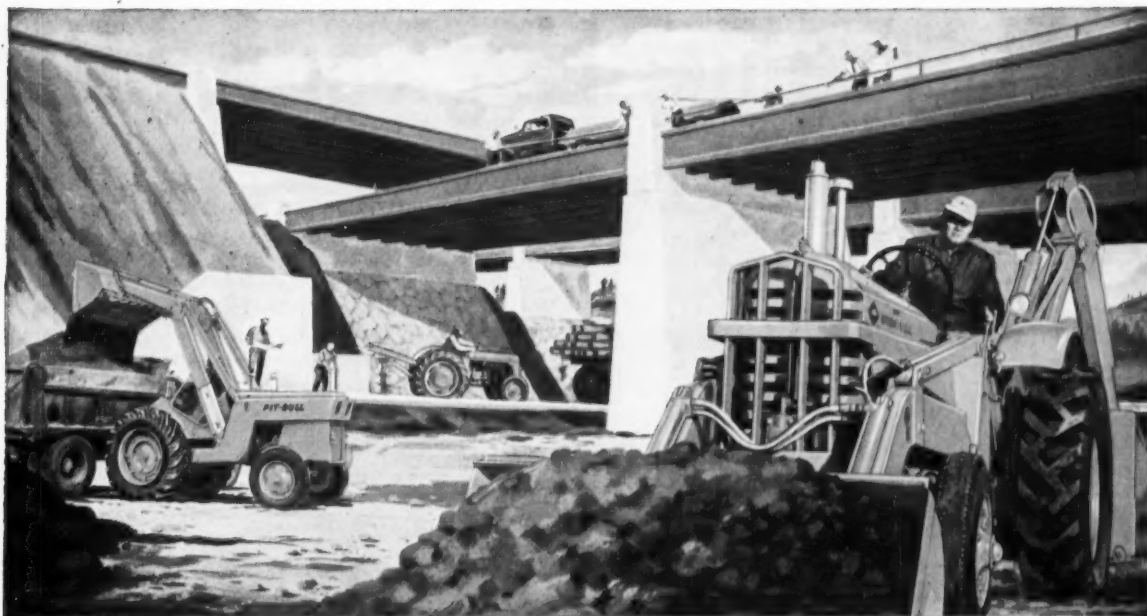
Workmen set L. B. Foster's lightweight steel sheeting on line by hand against the platform, then drive it with an Ingersoll-Rand sheeting hammer to a depth of 2 ft to stand by itself. They move the platform manually to repeat the process along each section of trench. On curved sections, plywood cut on an arc of 40-ft radius is attached to the top and bottom of the platform. The sheeting is set against this. When working longer sheets, workmen extend the platform to a height of 12 ft.

All the sheeting for a trench is set in this fashion. When all sheeting is in place, the men remove the platform and drive the piling through clay and silt to required depth with a McKiernan-Terry No. 7 hammer suspended from a Bucyrus-Erie Hydrocrane.

Adjacent sheets during final driving are driven about 3 ft. Thus each sheet always is guided by the adjacent sheet and no sheet leads its neighbor by more than 3 ft. By starting at the shallow end of a trench and progressing to the deep end, longer sheets always have the supporting benefit of shorter sheets previously driven.

When all sheeting is driven to grade, the trench is excavated, walers are placed, and spreaders of 3x5-in. angle irons are welded into place. Walers in the radius sections are notched, jacked against the sheets, and welded.

William Casson, general superintendent for the contractor, reports that this driving technique works well because "none of the sheets gets off line or buckles even though larger sheets are driven as much as 18 ft into a hard bottom."



TYPICAL WORK BULL PACKAGES: 42-hp Davis Pit Bull at left using $\frac{3}{8}$ -yd. bucket to clean up spill . . . 34-hp Work Bull Model 202, center, with auger digs holes for retainer

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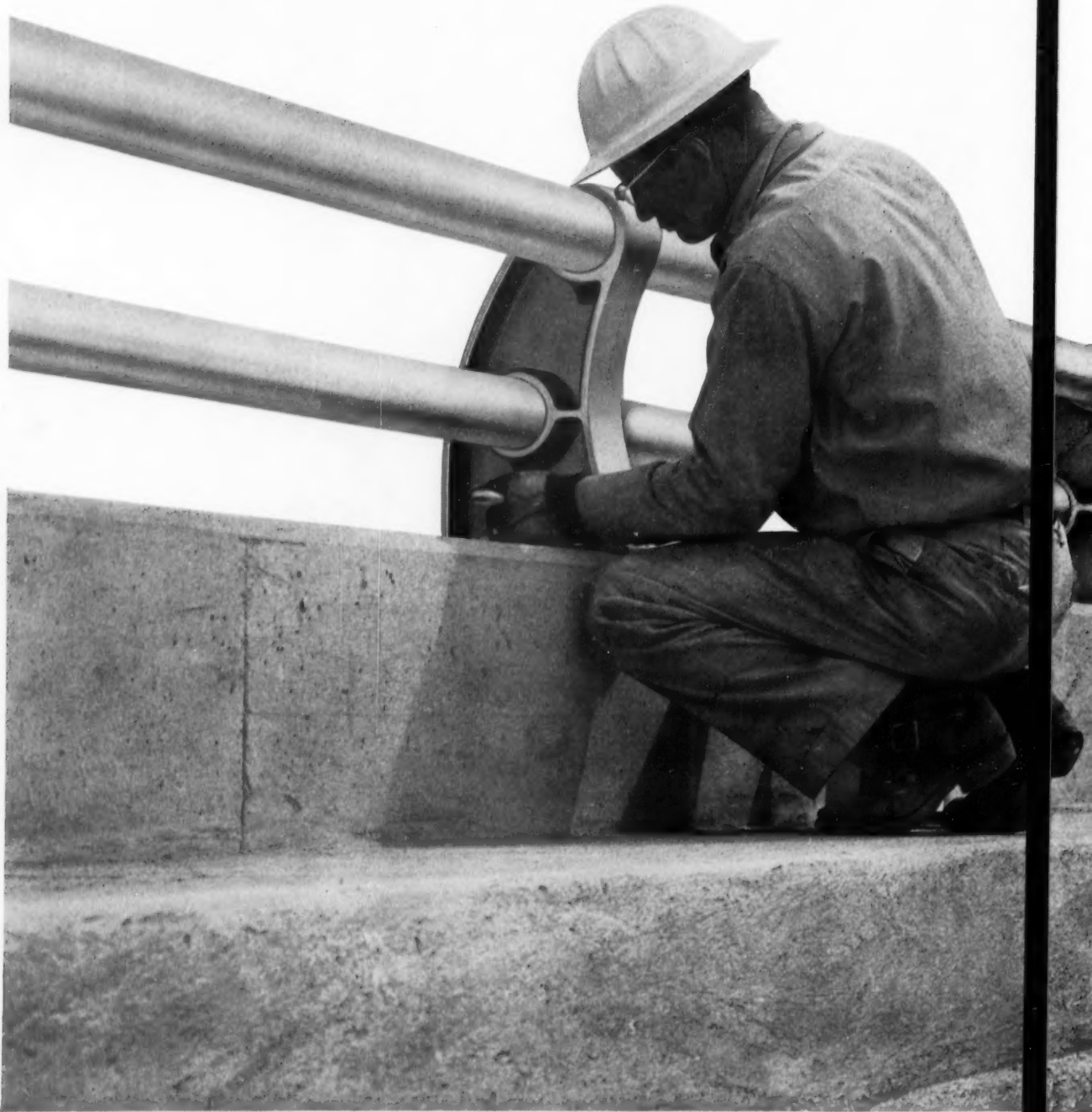
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NEW YORK: Adams 440 handled fine-grading on Sunken Meadow Spur Parkway, Long Island, for Contractor Henry Henslick. The grader's wide range of speeds make it possible for operator to complete work in shortest time.

INDIANA: Grading fill for 10' raise in constructing a section of Indiana Hy. 427, an Adams 660 (owned by Spears-Dehner, Inc.) spread an average of 4000 cu. yds. of heavy dirt per day — working in third gear (4.7 mph).

TENNESSEE: At Memphis, Adams 660 handled all grader work on 23-acre Southgate Shopping Center for Commercial & Industrial Const. Co. Contractor's Supt. said, "The Adams will do more work than any other grader we tried."

VIRGINIA: B. M. Woods, operator for D. E. Worley, of Rocky Mount, Va., says, "I've operated graders for 22 years. Adams is the best machine I've ever run." Worley's "660" is equipped with time-saving power-shift moldboard.

WISCONSIN: 150 hp Adams 660 levels fill and maintains haul-roads on State Highway 141, near Milwaukee, for Speedway Contracting. Big machine operates efficiently at speeds to 26 mph for maximum work-capacity and low operating cost.



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Constant-mesh transmission is a major reason why Adams has unequalled overall economy and high work-capacity. Designed especially for motor grader work, this rugged heavy-duty constant-mesh transmission gives highest efficiency under all operating conditions. Its precision-cut helical gears are crown-shaved for true mesh and quiet operation. Its gears and shafts are heat-treated to provide a wear-resistant surface that withstands shocks and abrasive action. Shafts and gears turn on anti-friction bearings. You will get longer, trouble-free service from your Adams transmission . . . which means greater work-capacity, greater earning power over the years.

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Additional range Opt. Creepers (mph)	(Not needed)	0.23 to 1.82	0.25 to 1.76	0.25 to 1.76	0.24 to 1.62	0.28 to 0.96
Reverse (mph)	0.22 to 24.4	1.1 to 13.7	1.2 to 13.2	1.2 to 13.2	1.1 to 12.2	2.5 to 3.2
Tires (std.) Front	14.00 x 24	14.00 x 24	‡13.00 x 24	‡13.00 x 24	‡12.00 x 24	10.00 x 24
Rear	14.00 x 24	14.00 x 24	13.00 x 24	13.00 x 24	12.00 x 24	10.00 x 24

*Usual working weight

†Optional



MONTANA: Adams grader builds canal embankments for the State Water Board. Contractor Chas. V. Sullivan, of Schye & Sullivan, says, "You can roll more dirt with Adams than with other graders in the same work range."



ILLINOIS: Burlington Roadbuilders, of Carthage, use Adams 660 to mix and spread surfacing on secondary roads. Says owner-contractor Lovett, "We do a lot of blade-mix work that you just can't do with other graders."



MICHIGAN: Blacktopping country roads, Contractor John Yerington uses 60 hp Adams 220 for road surfacing and light grading . . . uses his larger graders for heavy construction . . . figures he cuts machine expense 20 to 50%.

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MEXICO: Contractor Zeus, S.A. of Mexico, D.F., uses 3 Adams 550 graders to help build a highway between La Paz and Santa Domingo. "We obtain correct grade and good service with Adams," says Engineer-in-Charge.

KANSAS: Along the Kansas Turnpike, Amis Construction Company, of Oklahoma City, worked Adams 150 hp 660 graders to level heavy fill, shape shoulders and banks, cut drainage ditches and maintain haul-roads.



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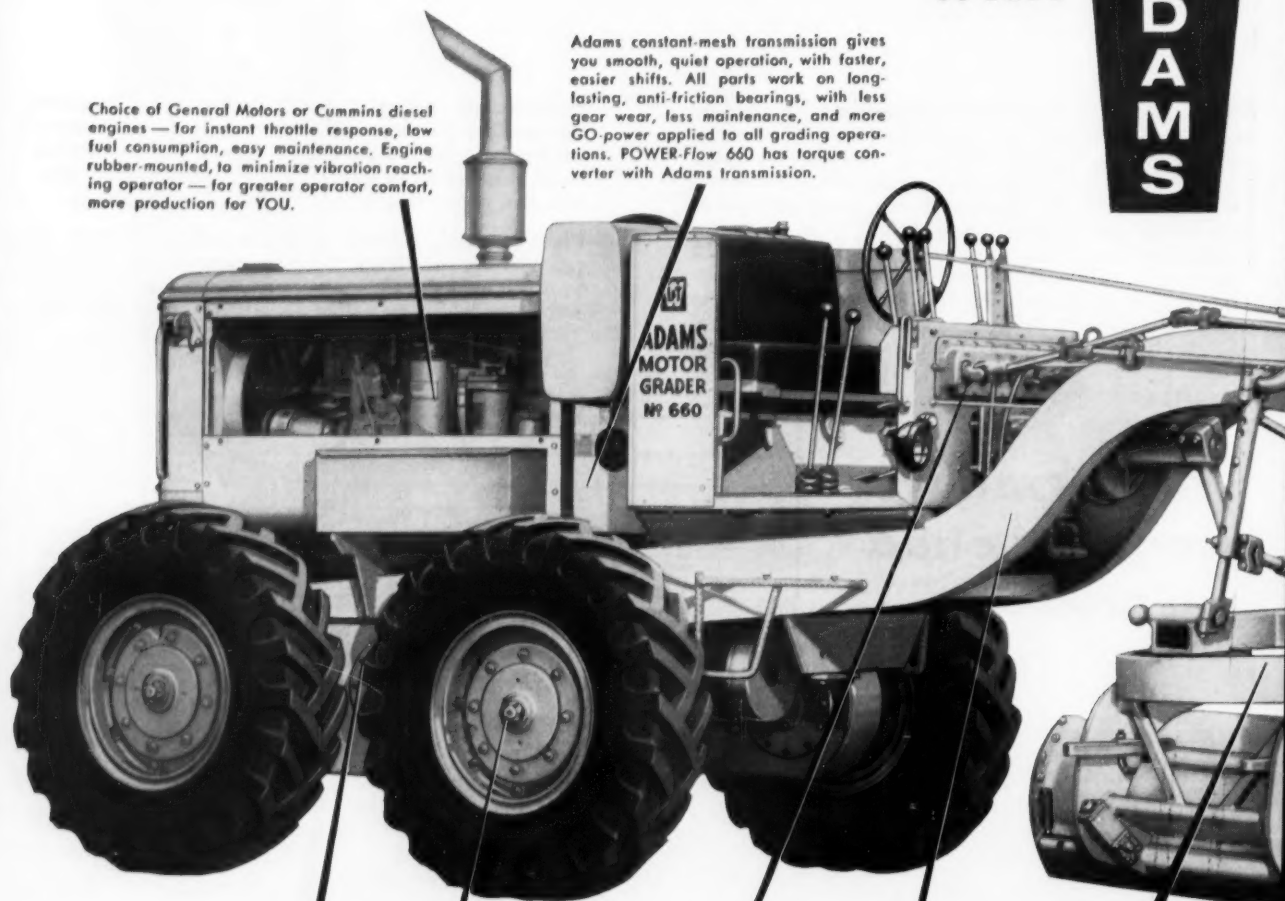
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Rear axle carries no weight, handles only power load. Heavy 2-piece housing carries the weight. Axle rides freely on anti-friction bearings, transmits maximum power to drive wheels for greater GO-power.

All operating control-box gears and shafts run on anti-friction bearings. All clutches slide on ball bearings. Control shaft universal joints have roller-bearings. Operator has instant, positive control at all times for greater accuracy.

Heavy-duty circle; machined top, bottom, and inside, for smooth, chatter-free operation. Strong T-shaped draw-bar supports circle for accurate blading.

Dual brakes — working on transmission as well as tandem-drive wheels — operate automatically at the touch of a convenient foot pedal. Operator is confident of quick, sure stops — feels free to use grader's GO-power in tight places.

Box-type frame of heavy steel channel, continuous welded... end-to-end... to take all shocks and stresses of heavy grader work. Streamlined shape has no sharp bends or joints to weaken or break.



MASSACHUSETTS



MISSISSIPPI



IOWA



per dollar invested... built-in **GO-power**

NOTE: You get all these modern advantages in Adams Models 660, 550, 440, 330, and in the POWER-Flow 660 which includes torque converter.

Operator has clear view ahead. With circle-lift controls mounted forward on high-arch frame, both ends of blade are clearly visible to operator, seated or standing. Assures more accurate grading... increases work-capacity.



High front axle straddles big windrows, gives 23" to 28" clearance, depending on tire size. Keeps axle from bulldozing windrow, with ample clearance when rolling sod, loose dirt, and oil-mix. Comes out of deep ditches without front axle dragging shoulders.

Correctly-curved moldboard, held securely to circle legs, can be adjusted to tilt angle desired. Ample clearances permit full 360° turn of moldboard while machine is in motion... will not interfere with either front or rear tires.

Leaning front wheels, pioneered by Adams, absorb side-thrust when blading heavy loads, cutting deep ditches and steep banks... make steering easier, permit shorter turns. Big front tires, standard on "660", available on all models for better flotation.

[Trademark]



OKLAHOMA



NEW MEXICO



OREGON

TURN PAGE FOR MORE GO-power —

(continued)

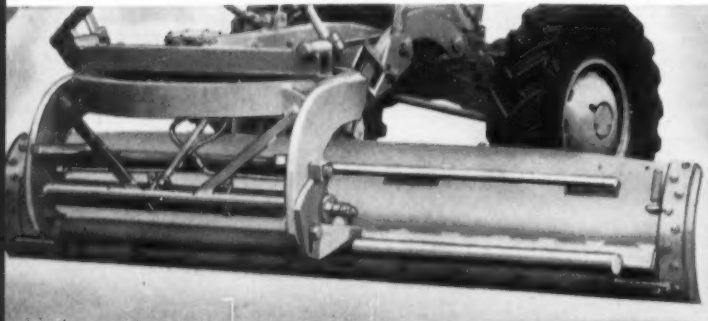
The BIG and the LITTLE of Adams† work-capacity and bigger

BIG

190 hp
POWER-Flow†
660

For your extra heavy-duty work . . . cutting steep banks, spreading deep fill . . . Adams POWER-Flow 660 gives you maximum work-capacity at all speeds from 0.0 to 27.4 mph. This big grader applies 190 hp thru 3-to-1 torque converter to give you top work-power through an infinite number of power-speed ratios. POWER-Flow 660 works thru varying loads at constant speed . . . will not stall . . . starts extra-heavy loads without lugging. The LeTourneau-Westinghouse designed torque converter cushions engine and drive against shock . . . makes operation smooth and easy. For greater GO-power, get POWER-Flow 660.

Optional Equipment for wider work-application of your Adams grader



POWER-SHIFT MOLDBOARD

If your work calls for quick and frequent moldboard shifts — for extended reaches, or for working around obstructions — this power-shift moldboard will help you do better work at a big saving in time. Hydraulic power, controlled from the cab, shifts moldboard 26½ in. to right or left of center position in 10 seconds. Shifts can be made while grader is in motion. (Optional on all Adams graders.)



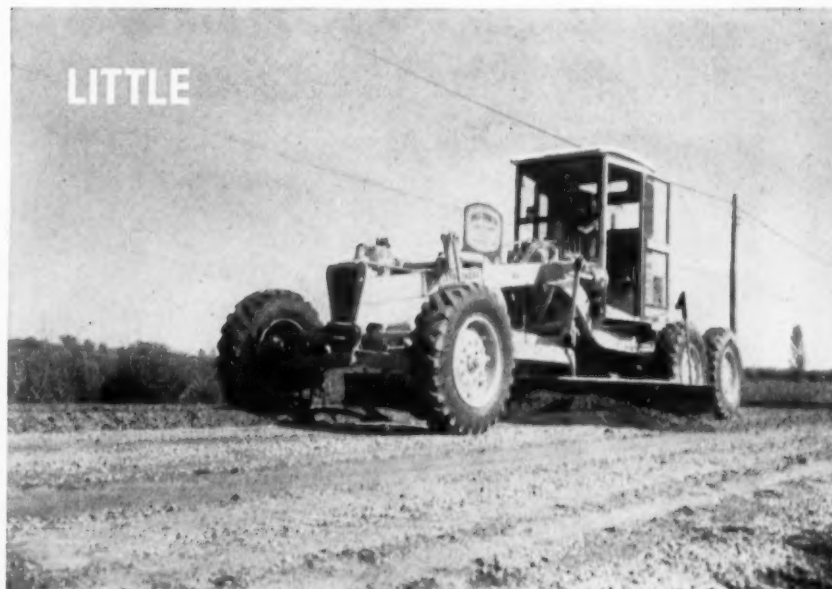
SCARIFIER

Strong, rigid V-type (straight-line or "220") scarifier used to break up blacktop and packed gravel road surfaces, and other materials too hard for grader blade to cut. Teeth are easily removed by lifting locking keys. Raising or lowering scarifier is done from cab. Grader blade can make full revolution without removing scarifier block. Scarifier is a "must" for most owners. (Available for all Adams graders.)

graders that give you more profits per dollar invested

60 hp Model 220

Use Adams 220 for your many utility jobs — maintenance, light ditching, banksloping, scarifying, fine-grading between forms, and other light-grading assignments. This releases your heavy-duty graders for more profitable production... increases the work-capacity of your operation. Adams 60 hp 220 works at 10 full-power speeds... leads its class with 5 forward, 1 reverse, and 4 optional creeper gears. Sturdy 4-wheel tandem-drive provides plenty of push-power for utility grading and ditching at minimum cost. The low price, and low maintenance of this hydraulically operated machine, make it a sound investment as a "second" grader to include in your equipment spread.



Select the grader best suited to your needs... from 6 Adams models ranging from 60 hp to 190 hp. **ASK FOR A DEMONSTRATION**... your nearby LeTourneau-Westinghouse Distributor will be glad to arrange it for you... no strings attached! Call him for complete facts and figures, or write the factory for full information.

†Trademark AG-1446-G

ELEGRADER

Elegrader plows and casts material, or loads into trucks. Side-casts 700 to 1500 cu. yds. per hr., loads into trucks at 400 to 800 cu. yds. per hr. A heavy-gauge disc-plow places material on belt conveyor which may be adjusted to load high trucks. Hinged conveyor folds for travel. Conveyor lengths: 17½', 19', 20½', 22', 23½' and 25'; to 28½' and 30' when used with tandem-wheel outrigger (pictured here). Elegrader is driven by PTO. (Available for Adams 660, 610, 550, 440, POWER-Flow 660 and Cat No. 12 graders.)



LeTourneau-WESTINGHOUSE Company, PEORIA, ILLINOIS
A Subsidiary of Westinghouse Air Brake Company

Where quality is a habit

PRODUCING AGGREGATES



THREE 125-FT THICKENERS help produce sand for concrete dam in Washington. Wash water containing 130 to 180 tph of minus 100

mesh sand, too fine for use, is fed to these units. Silt underflow is discarded, clear overflow reused. (Dorr-Oliver photo)

11. Washing Plants—Part II

By W. A. RUNDQUIST
Vice President
Pioneer Engineering Works

THE PRECEDING CHAPTER covered some of the more practical ways of washing coarse aggregates; that is, material over $\frac{1}{4}$ in. in size. But economical preparation of materials from $\frac{1}{4}$ in. down (generally called sand) requires different equipment and methods.

Aside from washing sand to remove dirt and silt, hydraulic methods are employed to size the material and to classify or separate it into the proper particle designation. After these steps, it is usual procedure to dewater the product.

Washing aggregates to clean them is not new. Within recent years, however, much closer attention has been given to both

the cleanliness and the gradation of the fines in construction aggregates. Thus has developed a new art in the processing of aggregates—an art requiring more technical know-how and methods more precise than those usually associated with the mere washing of gravel and rock. At the same time, it has been necessary to advance the art in a practical way so as to produce material at a reasonable price.

As pointed out in Part I, screening is the best way to separate coarse aggregates into size ranges. With fine materials, however, screening on less than No. 8 mesh usually is impracticable. This condition is aggravated by the fact that when coarse materials are washed, too much product in the $\frac{1}{4}$ -in. size-range is apt to be lost. This necessitates a split at about $\frac{1}{4}$ in., throwing every-

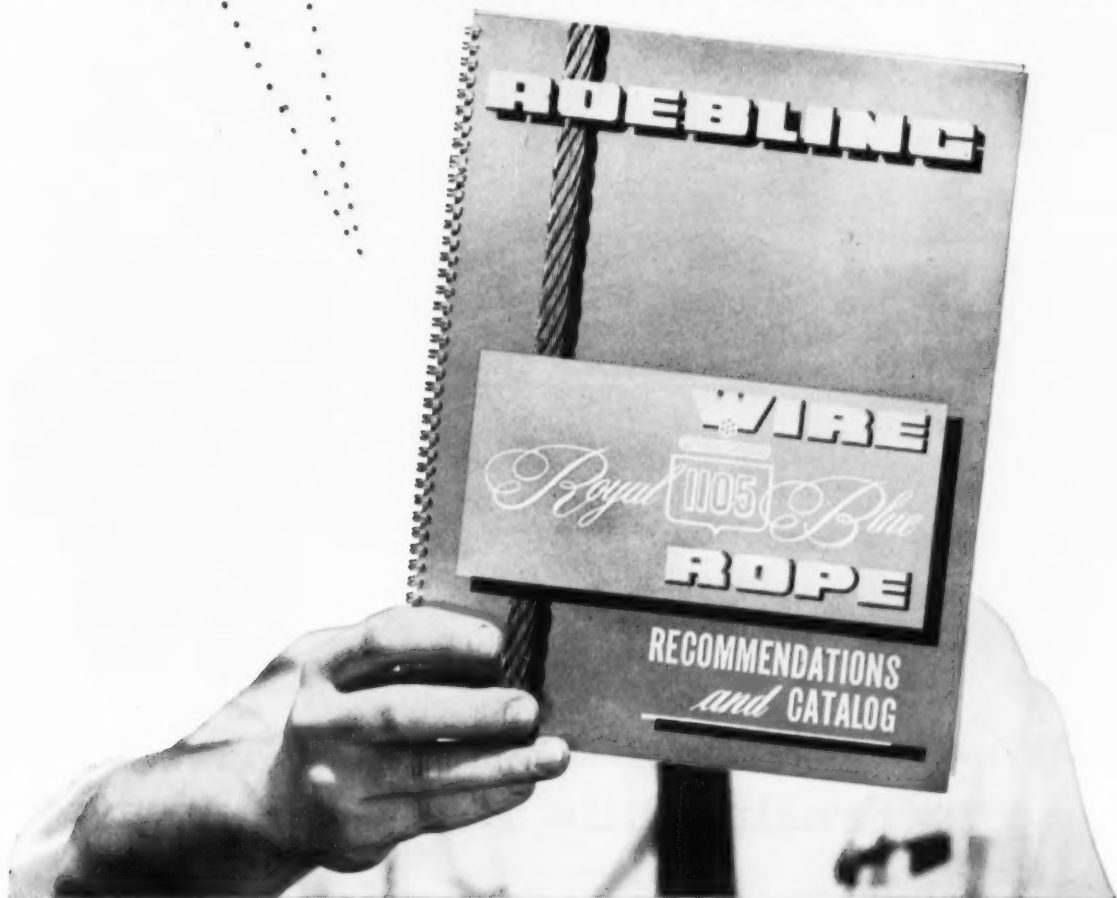
thing from $\frac{1}{4}$ -in. minus into the category of requiring hydraulic separation for best gradation.

Sometimes the coarse aggregate does not require washing, but the sands do. Then the most likely answer is to use dry screening on the $\frac{1}{4}$ - to $\frac{1}{8}$ -in. split, and to use hydraulic separation on only the minus $\frac{1}{8}$ -in. products.

Thus the question arises: Just what does hydraulic separation do that cannot be done economically by screening?

In dry screening, the required screen surface area is too great because of the small amount of material passing through per square foot. Water sprayed on the deck would increase screen capacity (by about $2\frac{1}{2}$ times for a $\frac{3}{8}$ -in. opening to about $3\frac{1}{2}$ times for a $3/16$ -in. opening) as compared to dry screening. However, from $3/16$ in. on down to

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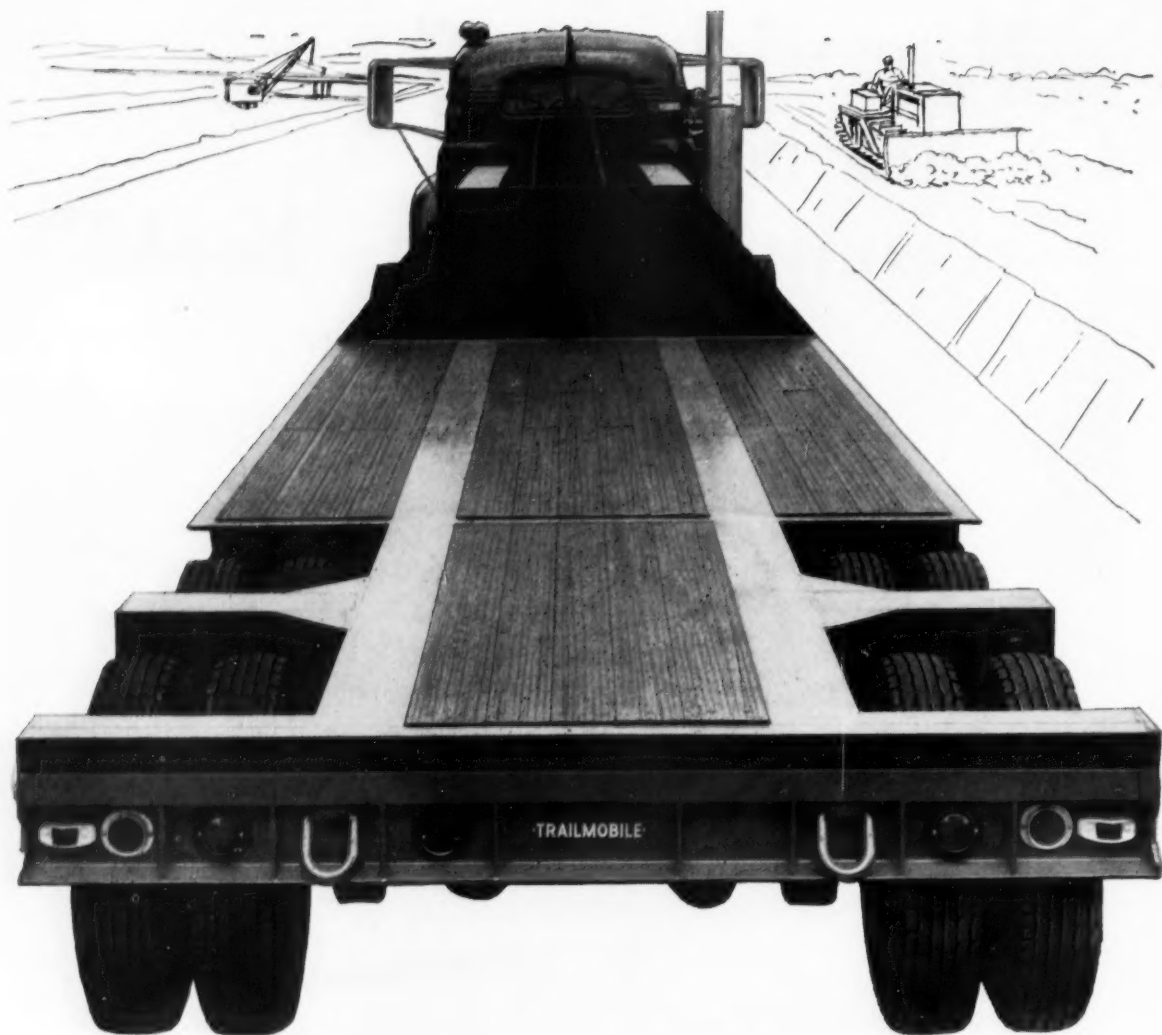
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PRODUCING AGGREGATES ...

continued

finer approaching 200 mesh, water on the screen would have less beneficial effect. That's because in these smaller mesh sizes the water itself would not readily pass through. Instead it would wash over the screen carrying much of the fines with it.

With hydraulic separation, a large amount of water is used. Here separation depends on the relative buoyancies of the grain particles and on their settling rates under specific conditions of water flow and turbulence. In some cases, separation depends on the relative specific gravities between the materials to be separated and the hydraulic medium. In a certain sense, this applies when water is used to separate particle sizes of sands. Perhaps it would be more apt to say this separation of sands is based on relative densities or that the process separates by gravity.

In its strictest sense, however, classifying means that several sizes of sand products of equal specific gravity can be separated while rejecting slimes, silt, and similar deleterious substances. But sand particles are not necessarily always of the same specific gravity, so frequently both specific gravity and particle size affect the rate of settling. As a consequence, you cannot always estimate the probable gradation of the final products without preliminary tests on the material. Nor can you be sure of product quality without analysis and tests after processing.

In any hydraulic classification of sand, the amount of fines retained with the final product will be dependent upon:

1. Area of settling basin.
2. Amount of water used.
3. Extent of turbulence in settling area.

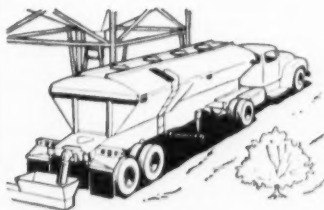
Obviously, the area of the settling basin generally will be fixed. Hence the amount and size of fines to be wasted will be determined by regulating water quantity and turbulence.

Now let's consider some of the more popular types of equipment available for washing, classifying, and sizing sand aggregates.

Fine Material Screws

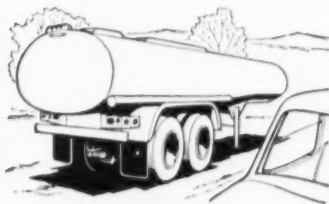
Fine material screws, frequently called classifiers, have long been popular for cleaning sand and separating out slimes, dirt,

There's a Trailmobile trailer for every construction need



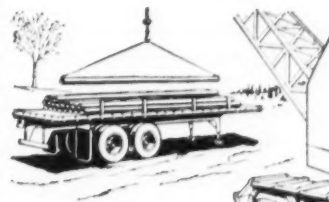
TRAILMOBILE CEMENT BULKERS

... transport large amounts of bulk cement to mixing plants at the job site. Both steel and aluminum types offer exclusive step-down design with twin screw discharge.



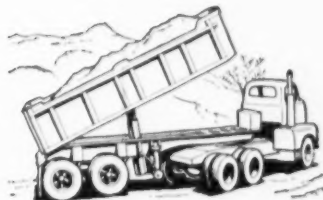
TRAILMOBILE TANK TRAILERS

... are widely used for hauling hot asphalt, road oils, and the great volume of water required at the site. Most units carry a unique guarantee against tank leakage.



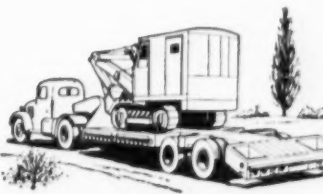
TRAILMOBILE PLATFORM TRAILERS

... are used for carrying lumber, cement forms, drainage tile, straw bales and sundry light equipment. "Sideless feature" permits simpler, faster loading and unloading.



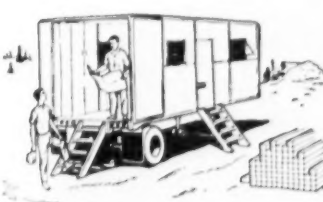
TRAILMOBILE HYDRAULIC DUMPS

... provide big capacity in a dump-type trailer for hauling and unloading sand and gravel. Unusually rugged construction guards against costly out-of-service time.



TRAILMOBILE LOW BEDS

... are used to deliver heavy road building equipment to the job area. Steel shovels, bull dozers and other large tractor-treaded units can be easily transported on these powerfully built trailers.

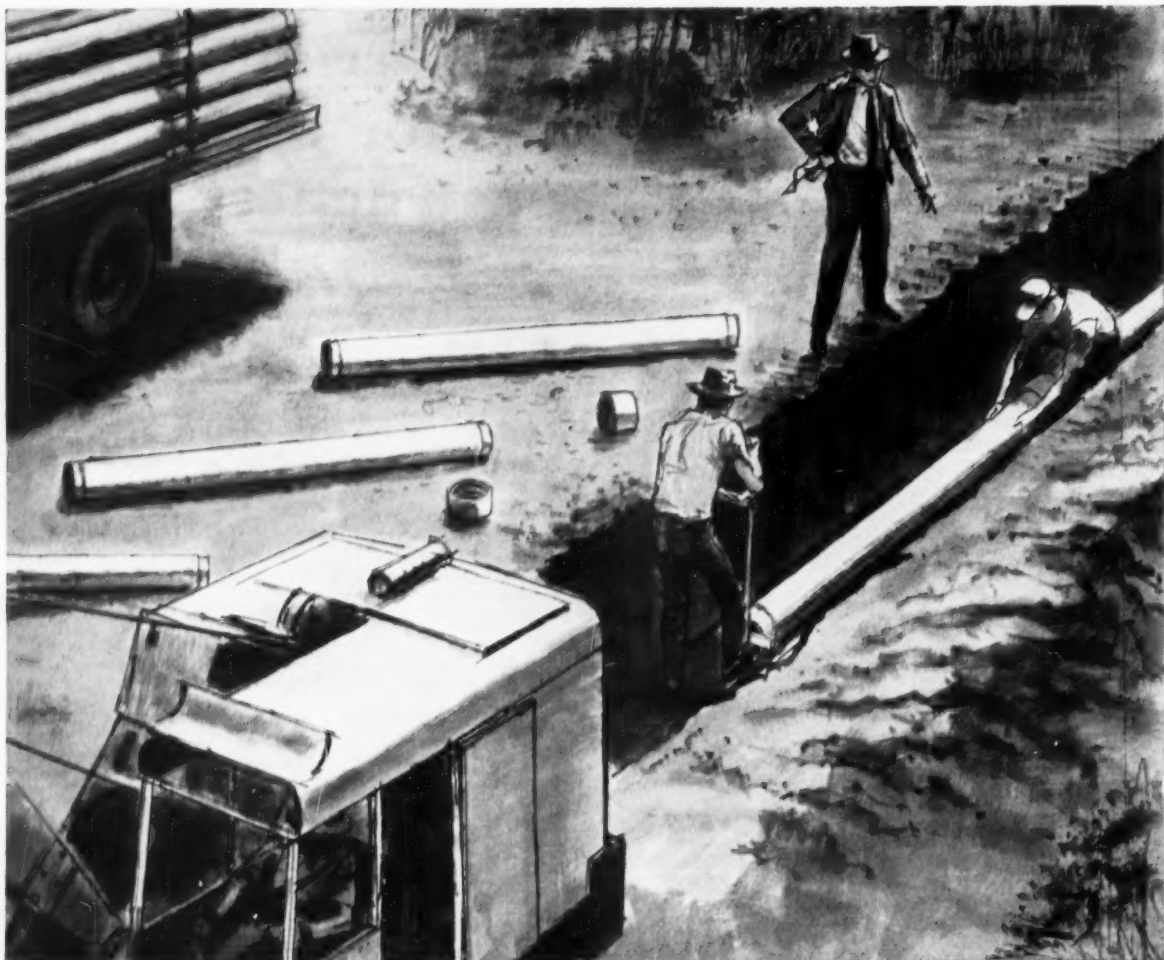


TRAILMOBILE FREIGHT VANS

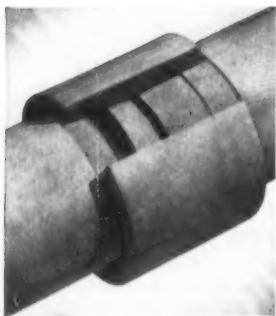
... combine weather protection and mobility for hauling general supplies. Low cost used vans provide ideal job site offices, tool shops or storage facilities.

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Transite Pressure Pipe is light-weight and easy-to-handle . . . quickly assembled with the Ring-Tite Coupling!

With Transite® Pipe, installation crews move along fast! So fast, they consistently keep up with the excavator—installing pipe as rapidly as the trench can be opened.

Ease of handling and simplified assembly explain these advantages. Light in weight, Transite is easier to truck, easier to handle on the job. With the Ring-Tite® Coupling only simplest tools are needed for joining—pipe ends are automatically positioned within the coupling to allow for expansion.

So save while you assure city officials and engineers top economy, long trouble-free performance with Transite. For its smooth interior (flow coefficient is $C=140$) often permits selection of smaller diameter pipe . . . *always* keeps pumping costs low. And since Transite can't tuberculate, water systems can be designed without allowing for future flow reduction caused by that form of interior corrosion.

Let us send you further information on Transite asbestos-cement Pressure Pipe and the Ring-Tite Coupling. Write for booklet, TR-160A, Johns-Manville, Box 14, New York 16, N. Y. In Canada, Port Credit, Ontario.



Johns-Manville TRANSITE PRESSURE PIPE

PRODUCING AGGREGATES ... continued

and small fines. Basically, a fines screw is similar in construction to the coarse material screw described in the previous chapter. It has a single or twin screw flight running lengthwise in a tub. The lower end of the tub is flared to permit settling of the fines to be retained.

Adjustable weirs around the top of the sides and end of the tub's flared portion regulate the amount of overflow. The overflow is collected in a flume running around these sides and end. **Fig. 1** shows a typical fine material washer-classifier-dehydrator.

The product from a fine material screw is, of course, a single aggregate ranging in size from the largest feed to the cut-off point of fines removal.

Screw washers are often referred to as dehydrators, but this term is somewhat of a misnomer. Dehydration means removal of water from a substance. In delivering its product, a screw dehydrator actually removes the sand from the water—the screw flights work the material up the inclined portion of the tub, with discharge through an opening at the upper end. Thus it is apparent that the moisture content of the sand product depends on the length of tub above the water

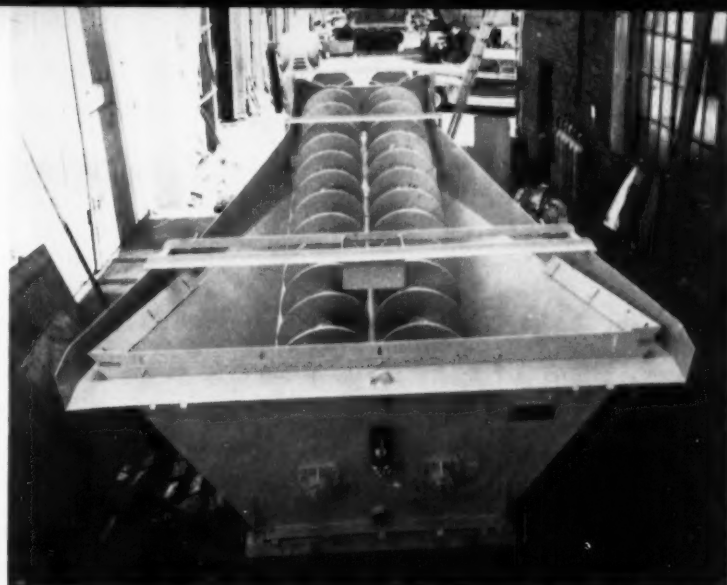


FIGURE 1.

McLANAHAN & STONE PHOTO

line. A longer screw will dewater to a greater extent than shorter one.

Screw type classifiers deliver a product holding anywhere from 10 to 15% moisture, depending on relative tub length with respect to effective screw diameter. Further, the moisture content depends somewhat on the minimum size of fines to be retained. Moisture content data usually are based on an average sand size with retention of a minimum of minus 100 mesh size. Retention of a higher percentage beyond

100 mesh size can be increased by one or a combination of adjustments, as follows:

1. Reduce screw speed.
2. Reduce volume of water entering tub.
3. Set all overflow weirs to same elevation.

Reducing the screw's speed cuts down turbulence. This permits more of the extremely fine particles (down to 200 mesh size, for example) to settle so they are not carried out by the overflow. At the same time, the capacity of the screw in quantity of product

SPECIFICATIONS—SINGLE SCREW FINE MATERIAL WASHER-CLASSIFIER-DEHYDRATOR

Screw Diameter	20"	20"	22"	22"	24"	24"
Tub Length—Feet	22	25	22	25	22	25
Capacity—Tons per hour	35	35	45	45	55	55
Maximum Material size	3/8"	3/8"	3/8"	3/8"	3/8"	3/8"
H. P. (Normal) Req. (Electric)	5	5	7 1/2	7 1/2	7 1/2	10
Water Req. (G.P.M. at 25 P.S.I.) ..	30 to 210	30 to 210	30 to 230	30 to 230	30 to 250	30 to 250
Screw Speed—R.P.M. (Normal)	38	38	35	35	32	32
Weight of Washer—Pounds	6400	7150	7000	7650	7550	8300

Screw Diameter	30"	30"	36"	36"	44"	
Tub Length—Feet	22	25	22	25	32	
Capacity—Tons per hour	80	80	125	125	175	
Maximum Material size	3/8"	3/8"	3/8"	3/8"	3/8"	
H. P. (Normal) Req. (Electric)	10	15	15	15	25	
Water Req. (G.P.M. at 25 P.S.I.) ..	30 to 260	30 to 260	30 to 310	30 to 310	30 to 450	
Screw Speed—R.P.M. (Normal)	26	26	21	21	17	
Weight of Washer—Pounds	9700	10900	11200	12300	17000	

TABLE 1.



WHILE STEELWORKERS place a sling on the next beam to go up, this American 100 Series lifts open web joists into position. The job is a new terminal building at the

Pinellas County (Florida) Airport. When completed, the terminal will give passengers service to St. Petersburg, and a 25-mile auto trip from Tampa will be eliminated!

NEW 12½-TON AMERICAN CRANE SETS STEEL SMOOTHLY, SAFELY

A modern terminal building and control tower are part of the new Pinellas County Airport that will serve St. Petersburg, Florida. Johns Contracting Company, Tampa, is using their American 100 Series Truck Crane for steel setting on this job. Working with up to 85 feet of boom, the 12½-ton capacity American frequently handled loads weighing up to 5 tons. Lifts ranged up to 71 feet high! More than 120 tons of structural steel are used in the terminal building.

NEW MODELS of the 100 Series Americans now in production offer steel erectors precise accuracy. An optional two-speed transmission permits steel beams to be "inched" into position without excessive jerking

or dangerous shock load stops. Perfectly smooth boom control—even with longest boom at maximum radius—results from American's overrunning sprag clutch. With this feature you have 100% boom control. There's not an inch of drop when you start the boom up or down. Steel is handled smoothly, safely, speedily!

See Americans working right *on the job*—talk to owners and operators! Ask your nearest distributor to show you American crawler and truck cranes in action. With any front—backhoe, shovel, dragline, clamshell or crane boom—in any capacity from ½-yard, 12½ tons on up, you'll see, in person, why American is the fastest growing crane line!

(Advertisement)

BOOMED WAY DOWN, the American 100 Series Truck Crane reaches out for another beam. Americans meet steel erectors' demands for precise, positive boom control and plenty of power to keep jobs on schedule. Combining low initial cost with low operating cost, the 100 Series is an extremely versatile machine that operates with any front. As a truck crane its high speed mobility carries it from job to job with minimum travel time. On crawlers, the 100 rolls over tough terrain—its wide undercarriage offers unusual stability, yet has a full 13½-inch clearance.



REACHING UP to a bridge deck to place concrete is an American 300 Series Crawler! On this turnpike job the contractor uses his American to drive piles, handle forms and place concrete. American crawler and truck cranes accommodate all fronts—offer a complete line that meets every contractor's needs. American distributors, who have detailed information on the entire line, will study your requirements, help you select the exact models best suited to your operation. Call your distributor or write direct.

NOW CELEBRATING its 75th year of service to the construction industry, American Hoist actively continues its program of product development and refinement. Most recent outgrowth of this plan are the American 100 and 200 Series machines. These crawler and truck cranes offer capacities of ½-yard, 12½ and 15 tons; ¾-yard, 22½ tons. They bring work proved American performance and efficiency to contractors with jobs requiring smaller capacities, but maximum crane efficiency and ruggedness. Remember, there's an American Crane for your job—no matter how small or large!



SETTING THE PACE on big projects is American's big producer—the 700 Series! Working capacities are 2-yards dragline, 1½-yards rock shovel and backhoe. For steel erectors, 50 tons capacity on crawlers or truck crane. Finger-tip air controls give operators immediate response to every command. As a result, every move of man and machine counts! For sustained high production on the bigger jobs, it will pay you to investigate the American 700 Series!



AMERICAN HOIST
and Derrick Company
St. Paul 7, Minnesota

SPECIFICATIONS—DOUBLE SCREW FINE MATERIAL WASHER-CLASSIFIER-DEHYDRATOR

Diameter of Flights	36"	36"	44"
Tub Length—Feet	22	25	32
Capacity—Tons per hour	250	250	350
Maximum Material size	3/4"	3/4"	3/4"
H. P. (Normal) Req. (Electric)	25	30	50
Water Req. (G.P.M. at 25 P.S.I.)	40 to 600	40 to 600	40 to 950
Screw Speed R.P.M. (Normal)	21	21	17
Weight of Washer—Pounds	19750	22300	30000

TABLE 2.

PRODUCING AGGREGATES ... continued

per hour is decreased. This decrease in capacity is in direct ratio to percent of speed reduction, or slow down. This must be considered when determining the size of unit to handle the capacity required for any given size range of product (See Tables I and II).

The amount of water is important because it influences the degree to which a specified size of fines is retained in the product. Less water will be required when retaining 200 mesh fines, for example, than when retaining 100 mesh in any given screw classifier.

If the sand is derived from a dry screen, it is obvious that water must be supplied to the washing tub. If the sand is derived from a wet screen, some water will enter the tub with the sand, but more will have to be added. Water usually is supplied and regulated through a valved inlet at the bottom of the tub's lower end.

Most screw classifiers are fitted with a perforated false bottom through which the water must flow, causing a rising current effect to assist in the sizing.

Fines retention is further controlled by adjusting the weir plates to regulate the depth and rate of overflow. When all plates are level and at equal height, more fines are retained. When one or two are lowered, the overflow at the lower level is speeded up, carrying more fines with it.

Manufacturers of screw-type classifiers publish data that indicate the gallons of water per minute required to produce sands having a minimum of a designated mesh size of fines. These

continued on page 190

ROCKFORD

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Regardless of your needs, ROCKFORD CLUTCH engineers can specify a size and type clutch that will operate most efficiently in your product—conserving space, power and final cost. Send a print or a description of your clutch need for their recommendations—



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Water was within one-half inch of the surface.

Material — top layer — silt, clay, and fill
middle layer — red sand, rubbish,
18" of sawdust
bottom layer — clay

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From the moment the FLEX-PLANE finisher was introduced it has been the favorite of the nation's highway builders. For the past three years it has been in a class by itself—the most versatile, most flexible, most portable and least expensive to operate of any machine on forms.

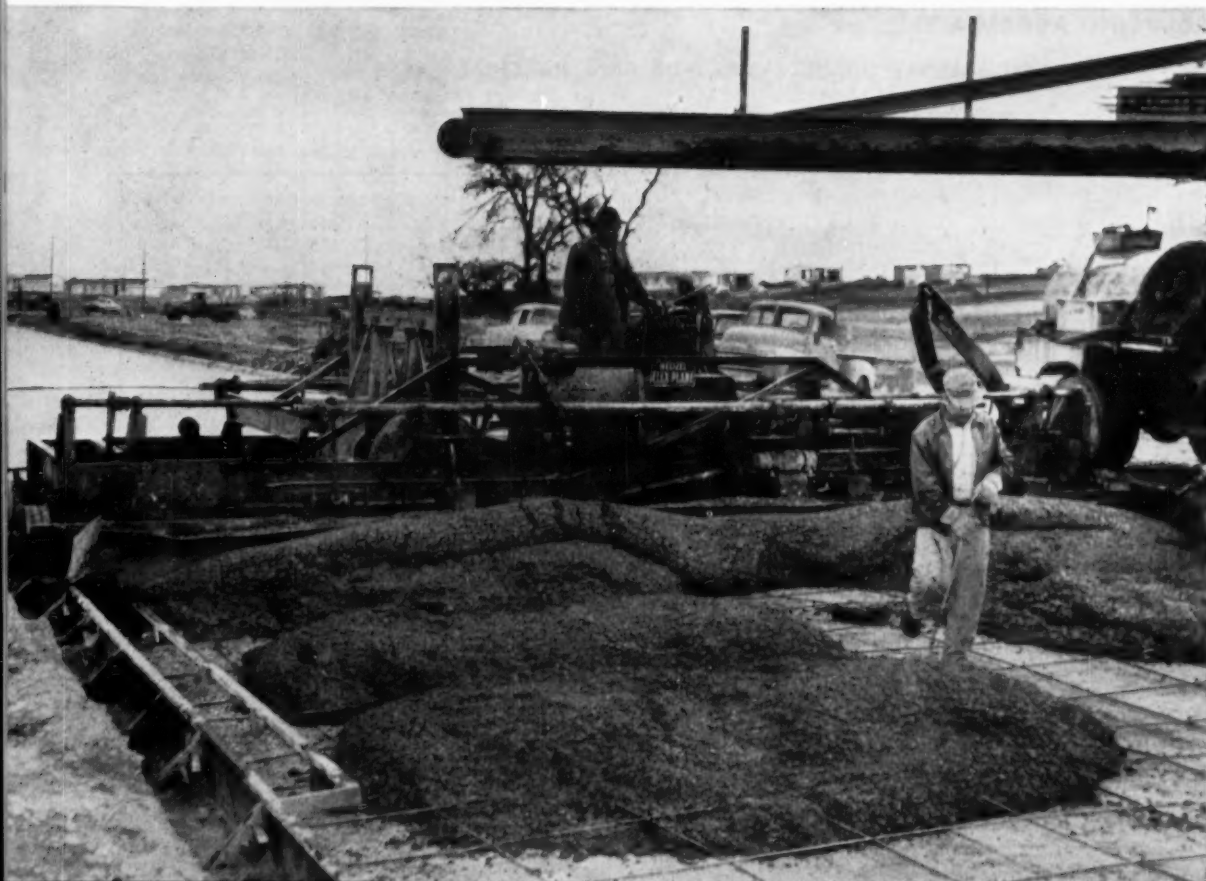
Now, for 1957, the FLEX-PLANE finisher is even

INDIANA TURNPIKE More miles of Indiana Turnpike were finished with Flex-Plane machines than any other.



NEW JERSEY TURNPIKE Holland Tunnel cutoff had many ramps and inter-sections. Self-widening feature paid dividends.





TEXAS CITY STREETS Contractor reported highest pouring ever. Credits Flex-Plane. Note amount of concrete in front of screed here.

better! It is more flexible, stronger and faster than ever! Inherent frame design features allow the greatest amount of flexibility—even as much as 12 to 25 feet in one machine! And, there is a complete line of FLEX-PLANES to cover any width range desired. Only FLEX-PLANE self-widening offers independent control of extension frames, which means both sides of the machine can be extended or retracted to-

gether—or individually, for the negotiation of complicated interchange patterns involving variable width and short radius super elevated curves. But, more important, it is the only really proved self-widening machine available today. More than 60 units operating throughout the nation attest to this.

The FLEX-PLANE carries the largest screeds in the industry—delivering the most satisfactory finish possible. Exclusive butt joint screed design enables screed lengths to be changed faster, easier than ever before. It is completely portable—a flick of the finger and it, instantaneously, becomes its own trailer.

Why not let FLEX-PLANE put you in contact with a FLEX-PLANE user? Talk to him and we are sure you, too, will GO FLEX-PLANE IN 1957!

RDEN STATE PARKWAY Contractor watched machine operate on nearby Route 1 project. Bought immediately.



THE FLEXIBLE ROAD JOINT MACHINE COMPANY
503 THOMAS ROAD WARREN, OHIO

261

TYPICAL GALLONAGE CHART FOR FINE MATERIAL UNITS
Shows Maximum Amount of Water Tub Will Handle for Various Retention of Fines

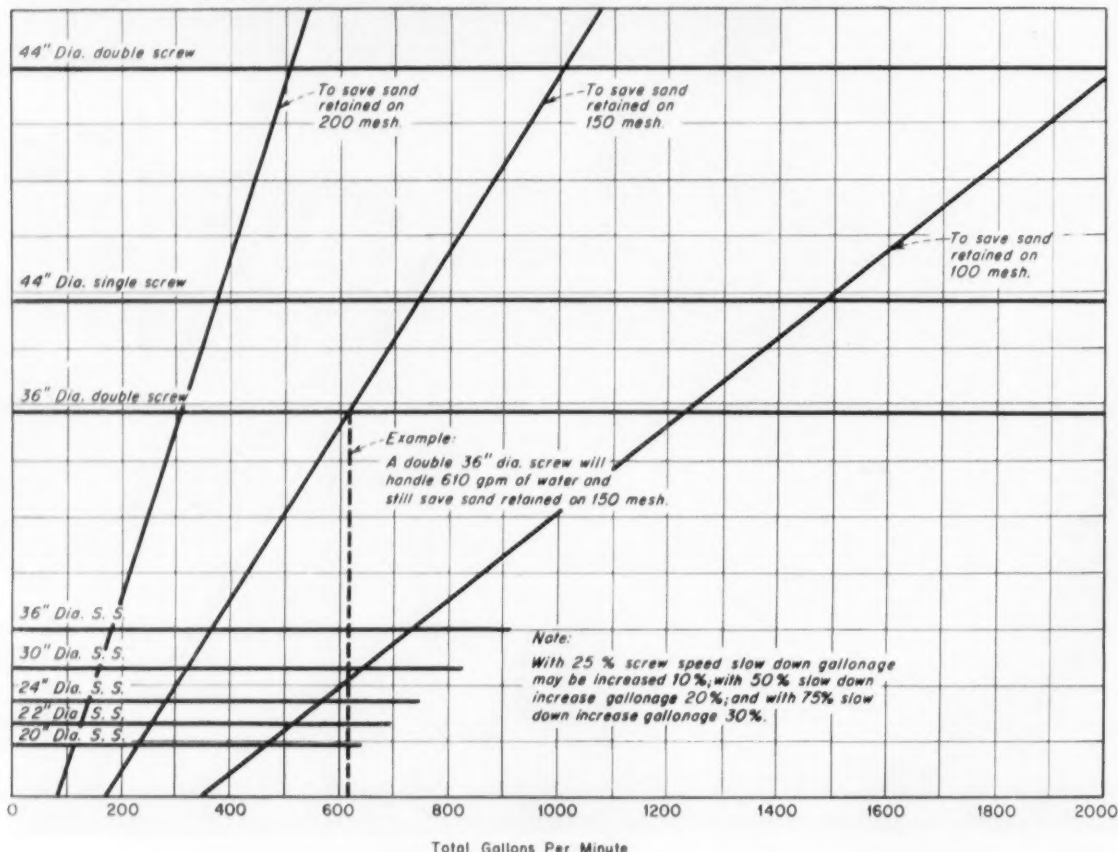


FIGURE 2. THE ABOVE chart for fine material units indicates the maximum water fed in relation to the mesh of material retained for various units. Example: Select a diameter, either single or double screw, along the vertical edge of the chart; use the horizontal line beneath

the diameter selected to enter the chart. Follow this horizontal line across the chart until it intersects a diagonal line which sets forth the desired mesh of the retained product. Drop a vertical line from this intersection and read the water capacity in gallons per minute.

EAGLE PHOTO

data vary somewhat with each manufacturer because of differences in design and operational characteristics. It is best to secure the manufacturer's recommendation on probable amount of water required, as any table that might be published here could be misleading.

Fig. 2 is a typical chart showing the gallonage for various sizes of fines retention with different screw classifiers as furnished by one manufacturer. It gives comparative figures for that make only. Note that with 25% slow down of screw speed, gallonage may be increased by 10%; with 50% slow down it may be increased 20%; and with 75% slow down, gallonage may be increased 30%. These same ratios should hold fairly accurate regardless of make of classifier.

Counter-Current Classifiers

The counter-current classifier is another type for classifying materials, usually of fine particle sizes, into a single product. Basically designed for classifying finer top size materials, it frequently is used in conjunction with a ball mill or rod mill in the processing of manufactured sand.

The counter-current unit (Fig. 3) consists of an inclined, slowly rotating cylindrical drum with continuous spiral flights attached to the shell interior. These flights form helical troughs that move the settled material to the upper end for discharge. The lower end of the drum is closed except for a central circular overflow opening. At the upper end is an elevator that discharges sand in a fairly dewatered state.

Sand Drags

Another device is the sand drag, sometimes called a settling tank drag (Fig. 4). More popular a few years back, it still is applicable where large quantities of water have to be handled, as when processing dredged material. While the sand drag does a satisfactory job on washing and classifying a single product, it is large and bulky for the amount of fairly well dewatered sand it will deliver per hour. This, of course, accounts for the trend in more recent years to the screw type machine.

The sand drag has a continuous series of flights secured to a pair of chains. These flights drag through the settled sand near the bottom of the tank and discharge the material at the top of the

inclined portion of the tub, as in the screw classifier. The flights create some turbulence to wash out fines and silt. And the rate of overflow is regulated by a weir plate at the lower end of the tub.

Here again the degree to which the sand is dewatered depends on the speed of operation and the length of the incline above water line. A sand drag 22 to 23 ft long, having a width across flights of 30 in., will deliver fairly well dewatered concrete sand at a rate of approximately 35 tph. On the other hand, a screw type classifier having a screw length of 22 ft and a screw diameter of 30 in. will deliver in the neighborhood of 75 to 90 tph of the same specification sand. But the horsepower requirement for a sand drag usually is less than that for a fine material screw classifier of like capacity.

Rake Type Classifiers

The rake type classifier (Fig. 5) has series of flights attached to rigid supporting members to form rakes. The rakes, usually two, operate 180 deg apart from each other in a reciprocal motion. They drag the fines up a slope and out of the liquid, discharging them at the upper end as in a screw classifier. The rakes are mechanically lifted for the return stroke by a rocker arm motion imparted to a crankshaft assembly. Some-

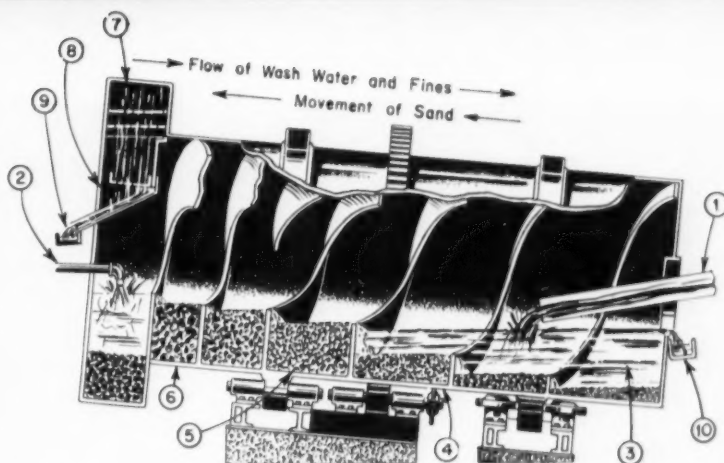


FIGURE 3.

1. Entrance for liquid-borne mixture of coarse and fine sand.
2. Wash water enters through product discharge opening.
3. Relatively quiet settling pool.
4. Spiral flights move settled particles to discharge end.
5. Counterflowing wash water carries fine particles to overflow at lower end of drum.

6. Pitch of spirals diminishes toward sand discharge end to work out slime and dirt.
7. Wash water in bucket elevators cascades out into pool with a cleaning action.
8. Some control of the moisture in the discharged sand is obtained by adjustment of baffles.
9. Discharge of dewatered sand.

HARDINGE PHOTO

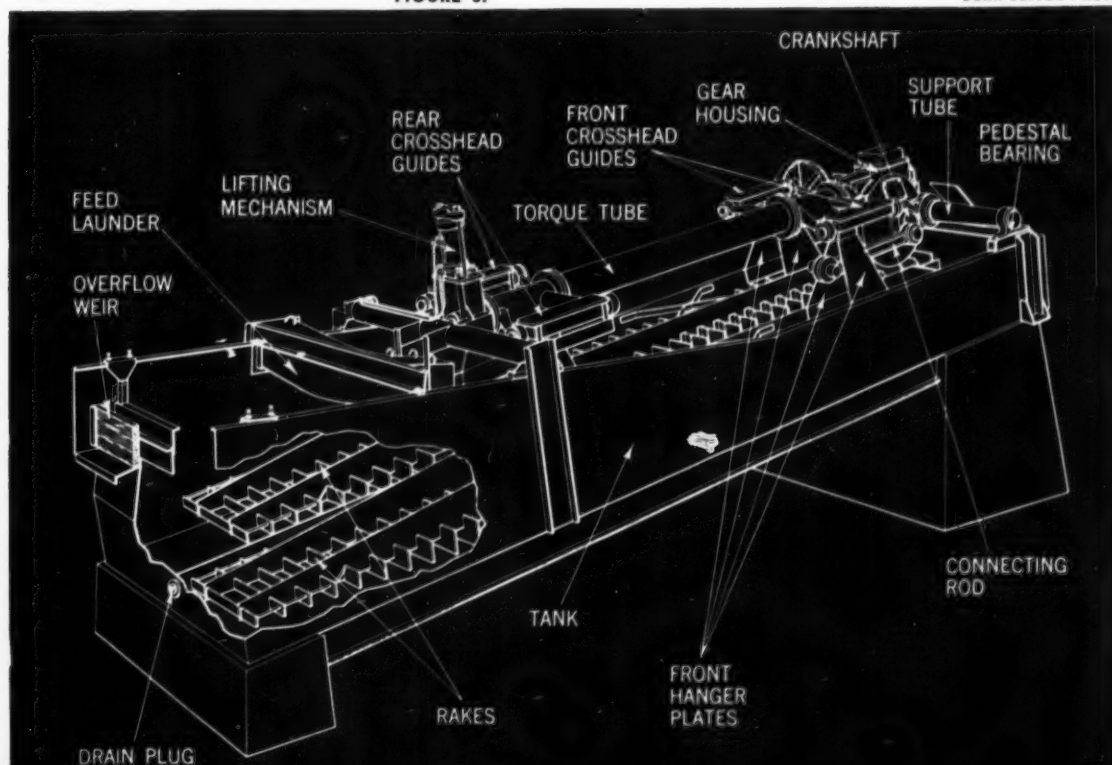


FIGURE 4.

ROGERS PHOTO

FIGURE 5.

DORR-OLIVER PHOTO





Extra Large Pretensioned Concrete Girders Produced At Speed Of One A Day!

Tufwire strands for four girders were pretensioned. Forms were set, reinforcing steel placed

Mammoth Spans Pretensioned With Union Tufwire Strand Adds Proof of Prestressed Concrete's Ever-Widening Adaptability

Ordered for the construction of a new triple super phosphate storage warehouse, each of these giant girders is 101 ft. 6 in. long, with a height of 12 ft. at the center, tapering to 4 ft. at the ends. They were cast by Prestressed Concrete, Inc., Lakeland, Fla., in a double bed, 422 ft. long. In the prestressing, a total of 48-7/16 in. Union Tufwire Stress-Relieved Strands were stretched in the bed in two rows—four girders to each row.

In this project, two of the many advantages which the Prestressed Concrete Industry has to offer, have been convincingly demonstrated. Both are of vital importance to the construction industry.

1st. Design and fabrication limits of Prestressed Concrete are far from being reached.

Rolling to the job: Giant 70-ton girder on the way to the site of chemical storage warehouse being built at Brewster, Fla.



2nd. The speed with which Prestressed Concrete sections are produced eliminates construction delays by by-passing materials in short supply, or on extended backlog delivery.

Architects and engineers are finding prestressed applications virtually unlimited. Prestressed components serve as foundations, floors, columns, beams, slabs, walls and roofs. For highway bridges, prestressed concrete is fast becoming standard design in many areas. For example, the state of Florida and its Turnpike Authority have standardized on prestressed concrete bridges. Girders or deck sections can often be mass-produced quickly and erected in less time than is required to install false work.

Up she goes! One girder has been placed in the structure, another is being positioned, and a third is on the ground ready for hoisting.





and the concrete cast progressively from one end of the casting bed to the other.

Union **TUFWIRE** Strand Used 100% In These Girders

As long time specialists in high carbon wire, the Union Wire Rope organization stepped sure-footedly into pioneering the technological development of stress relieved, high tensile wire and strand for prestressing concrete. Just as sure-footedly it has expanded research and production facilities to keep well ahead of the demands of the 300% yearly growth of the prestressed concrete industry.

We're geared to the needs of this amazing prestressed concrete industry—and geared for its future growth.

Today we're supplying Tufwire Stress-Relieved Wire and Strand to projects ranging from the largest in history's biggest highway building program . . . right on down to poles and farmers' fence posts. The orders

don't come too big or too small. You can be sure of prompt delivery from our strategic Mid-America location.

Have a problem? Whether you're already an on-site contractor or a permanent casting-bed operator—or are exploring the potential of prestressed concrete in your area—get in touch with our engineering department and research laboratories.

Would you like to have a reprint of a recent Tufwire advertisement which has been called "a primer of the prestressed concrete industry"? It distills the whole big story of prestressed advantages into 10 minutes of thought-provoking reading. It is a summary of fundamental facts supplied by a panel of prestressed fabricators and consultants who pioneered in the industry and have grown with it. Write for your copy today!



Small buildings, too, share the advantages and economies of prestressed concrete construction. This eye appealing shelter house in a park will minimize vandalism and be remarkably easy on maintenance costs. Compare the speed and facility of erection when structural members are mass-produced and delivered complete instead of laboriously being cast on the site.

UNION Tufwire Is Protected Against Rust and Corrosion

All shipments of Tufwire Strand are safeguarded against corrosive effects of dampness, salt air and damaging fumes. Another big Tufwire "plus"!

union

Tufwire

Stress-Relieved Wire & Strand

union  **Wire Rope corp.**

Specialists in high carbon wire, wire rope, braided wire fabric, stress-relieved wire and strand.

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Kansas City 26, Missouri

PRODUCING AGGREGATES . . . continued

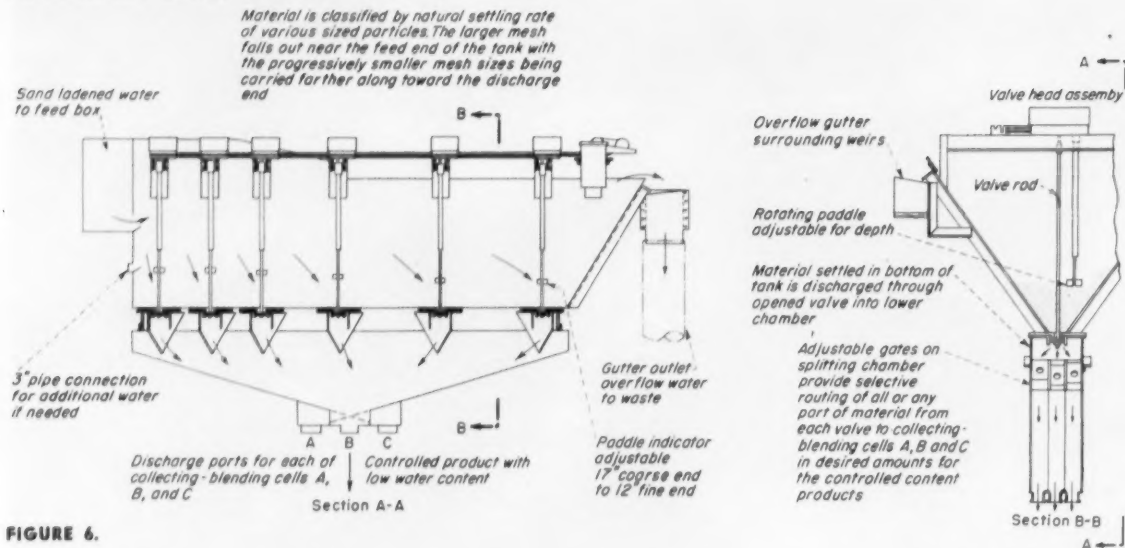


FIGURE 6.

times four rakes are combined in a large unit, which may even have a bowl type tank. The normal tank, however, is similar to that of a log washer, with an overflow weir at the lower end.

Water Scalping Tanks

Many material specifications today call for multiple sizing of sand, with provision for blending back to obtain the gradations required. Where pit material does not contain all the necessary sizes, they have to be manufactured. In either case, accepted procedure is to screen through the fine material from which the sand specifications will be obtained. Then this material is run into a water scalping tank, classifying tank, or sizer for multiple separation by grain sizes or particle specific gravity.

There is no mystery connected with such tanks. They are merely long settling basins capable of holding large quantities of water, into which material is fed from a screening plant. Water flows from the feed end of the tank to the other end. The heavier, denser particles settle out first, with successive settling all along the tank as the particles become smaller and less dense. Some may wonder, therefore, why sizing tanks of such design have become popular only recently. There are two reasons: (1) They weren't necessary when only one size of sand was required and specifications were more lenient, and (2) Satisfactory means for discharging, or drawing off, the desired products

only recently have been perfected to the point where they are economically feasible.

For the contractor or construction aggregates producer who finds it necessary to separate his sand into several sizes, the scalping or classifying tank (Fig. 6) is the least expensive and least complicated answer.

Apart from the multiple sizing, the scalping tank serves to eliminate the surplus water prior to discharge of product to a screw-type classifier. By so doing, the amount of water handled by the screw classifier can be regulated better for the mesh size of fines to be retained. It becomes apparent, then, that a water scalping tank will be followed by as

many screw classifiers as there are sizes of sand products to be made. (There are times when, because of the large amount of water that has to be handled, a water scalping tank is necessary even though only one sand product is required. Otherwise the screw-classifier would be unable to retain the smaller mesh fines.)

Adjustable weirs on the scalping tank regulate the rate and velocity of overflow to provide the size separations required. The various products sized by the tank are discharged through valved ports on the bottom. These ports are spaced at intervals to correspond to the usual sizes required. The valves, air or hydraulically operated by electric controls,

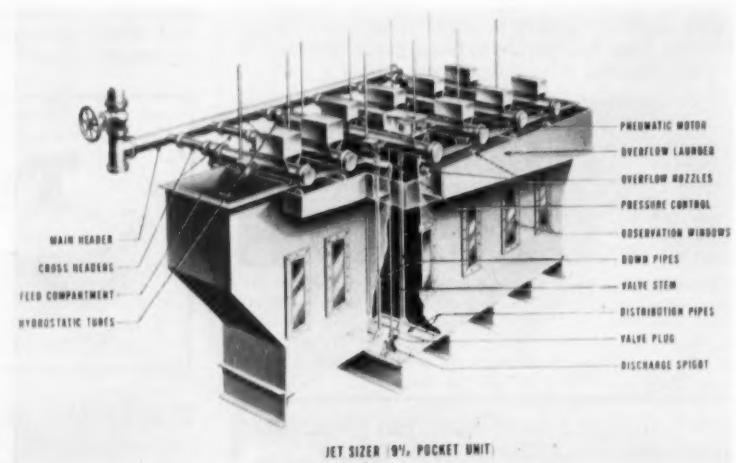


FIGURE 7.

DORR-OLIVER PHOTO



Don't play games...

get Le Roi's new
shock-absorbing rock drills!

You're a winner every time, too, with Le Roi's new shock-absorbing sinkers. They take away an amazing 55% of the punishing kick normally transmitted from the hammer to the operator—yet never lose an ounce of rock-shattering impact. This makes drilling so easy, we don't know how your operators can keep from playing tic-tac-toe. See these new easy-handling long-life rock drills at your local Le Roi distributor. He's got the new Model H10, H111, and H12 sinkers in stock right now . . . available for fast delivery. Or write Le Roi Division, Westinghouse Air Brake Company, Milwaukee 1, Wisconsin.

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AIR TOOLS





One Man Runs This Vibrator...Anywhere

NEW 115 VOLT AC-DC VIBRATORS

In addition to the high-cycle model, Homelite also has a new 115 volt AC-DC motor-in-head vibrator that can be operated from either standard 115 volt "house" current or with a low-cost Homelite carryable generator. A new 115 volt AC-DC flexible-shaft-driven vibrator for working concrete in small forms, reinforced concrete columns or in other "tight" spots is also available.

Write or call your nearby HOMELITE representative today for a free demonstration.

Manufacturers of
Carryable Pumps • Generators
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One man can run this Homelite High-Cycle Electric Concrete Vibrator anywhere . . . to place concrete faster, easier and more profitably than ever before. That's because he handles only the lightweight vibrator head and cable. The generator stays on the ground . . . or in any convenient spot within a 400' radius . . . out from under foot and away from pouring operations. No special cradles or scaffolds are needed.

You can handle 30 to 40 cubic yards of 2" slump concrete per hour with this powerful Homelite vibrator. Tough, kink-proof, handling hose goes anywhere . . . around corners, over obstacles . . . can't be injured by bending. Quick-connecting extension hoses let you work effectively in the deepest forms. The rugged, high-cycle motor built into the vibrator head will give long, profitable service at lowest maintenance cost. Carryable, 125 pound, Homelite generator supplies both high-cycle current for one or two vibrators and 110 V. DC current for your electric tools and floodlights.

Complete Line of Homelite Carryable Construction Equipment Now Available



Self-Priming Centrifugal Pumps . . . Carry these lightweight, dependable pumps anywhere. Non-clogging design . . . 28 foot suction lift . . . capacities up to 15,000 g.p.h. . . sizes from 1½" to 3". Diaphragm pump also available.



Chain Saws For Every Job . . . Now you can choose from a full line of lightweight, powerful Homelite chain saws. From 3½ to 7 horsepower . . . 19 to 29 pounds. Brush cutting and clearing attachments are available to handle all your cutting jobs.



Carryable Gasoline Engine-Driven Generators . . . Lightweight Homelite generators can be carried and used anywhere to provide high-cycle and 115 volt power for your electric vibrators, tools, and floodlights. Complete range of sizes up to 5,000 watts . . . all standard voltages.

HOMELITE

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PORT CHESTER, NEW YORK

PRODUCING AGGREGATES . . . continued

open when settled material reaches a predetermined height over the ports.

Sand, approximately 30% water laden, is discharged into flumes under the tank. These flumes, in turn, discharge into the screw classifiers and waste. When planning this type setup it is best to install at least three flumes. These, combined with metering splitters at the discharge ports, enable the proper blending for production of at least two sizes of sand product and wastage of the excess or unwanted particle sizes.

Of somewhat refined design are sizers (Fig. 7). These are tanks made up of a combination of cells into which successive settling by particle size and specific gravity takes place. In each cell, water is introduced at the bottom through nozzles. This creates a stream of rising water to produce what is called "teetering," or hindered settling of the particles. In each succeeding cell the velocity of injected water is reduced so that succeeding finer fractions are held in suspension. The fines not desired are classified out.

Hindered settling, by keeping the particles in suspension, creates a definite specific gravity in the water (pulp density). As pulp density increases through more particles in suspension, the hydrostatic head in the cell increases. When it reaches a certain point, an indicator probe actuates an electric pressure control to open a plug discharge valve in the bottom of the cell. When enough of the settled particles have been discharged, the pulp density decreases to a point where the valve closes.

The sizer is perhaps more accurate than a scalping tank in delivering a series of sharply graded sizes of sand. That's because of its cellular construction and the method of control through pulp density. But it has design refinements not always required for producing construction sands. It is a sizer—not a scalping tank—and is used extensively in the hydraulic processing of many minerals not necessarily associated directly with aggregates. Nevertheless, many commercial sand producers employ sizers in the preparation of blending sands.

continued on next page

IDEAS for highway and airport paving



NEW 36-page educational text-book catalog, illustrated by 85 photographs, diagrams and charts, covers all phases of concrete paving plant operation for the benefit of highway and airport contractors and engineers. It features:

- theoretical plant and paver production tables
- formula for estimating truck requirements
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- pictorial "tours" through typical 1, 2 and 3-stop plants
- latest developments in plant automation
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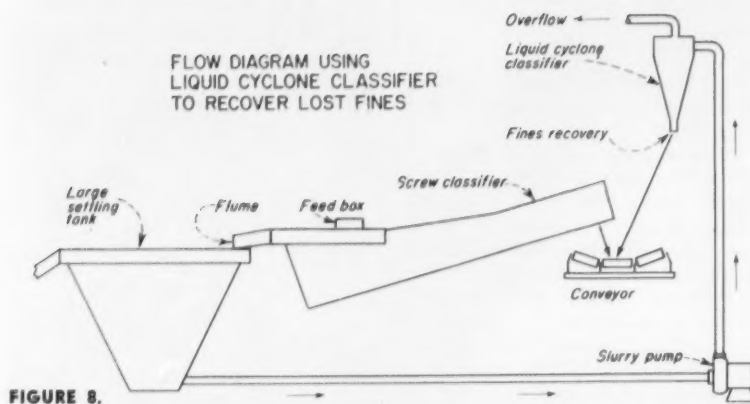


FIGURE 8.



Above: Pouring section of first floor of new 5-story Herman Miller Bldg., Dayton, Ohio. Right: Close-up of operator using a Master "I-Man" vibrator between closely spaced reinforcing rods.

"I-Man" vibrators cut cost on \$4,000,000 office building

"Our two 'I-Man' vibrators are the best pieces of equipment on the whole job," says Zimmer Miller, Supt., Miami Valley Construction Co. "We use them exclusively to vibrate the 7,000 yds. of concrete going into footers, columns, walls and slabs on this job. We cover 6,950 sq. ft. with each slab pour and *one man* with a Master vibrator keeps up easily with the pour and thoroughly vibrates the heavily reinforced pan slab.

"We like these vibrators because we know they can take it and because they save us money every day on the job."

You'll like the new "I-Man," too, because it gives you 100% longer life than other makes. The motor is sealed in the vibrating head; there's no flexible shaft to get out of whack; no oiling or greasing problems. It's actually a self contained, precision built vibrator. It weighs only 25 lbs. . . and with no heavy engine or motor to drag around, one man handles it easily. Plugs into any regular 115 volt AC or DC outlet. Find out yourself . . . write for free folder or ask your Master distributor for a free demonstration.

MASTER VIBRATOR COMPANY
150 Stanley Ave., Dayton 1, Ohio

MASTER

PRODUCING AGGREGATES ... continued

And as much care should be given to proper gradation of blending sands as to the gradation of, say, concrete or mason sand. Accurate control of blends is impossible unless the sands are well graded.

Colloidal Suspension

As mentioned, scalping or classifying tanks usually are installed ahead of screw or drag classifiers. But when sand particles are coated with clays that wash off into colloidal suspension, the water may become so "heavy" that fines to be retained are washed out with the overflow. Some of these fines may be as big as 50 mesh.

The obvious answer here is to add more water to dilute the pulp to decrease its apparent specific gravity. This may require a larger tank installation in a place and manner not readily feasible. Further, the extra water may not be economically available.

Another method of overcoming this problem is to charge the screw classifiers directly from the screening station, then collect the overflow from the screws in a large diameter settling tank. Settled material can be drawn off and run through a liquid cyclone classifier for recovery of the fines previously lost. Fig. 8 shows a setup of this type.

Liquid Cyclone Classifiers

Fed a pumped mixture of sand and water, the liquid cyclone unit (Fig. 9) classifies mainly by centrifugal force instead of gravity. It has a conical shell, properly

continued on page 202

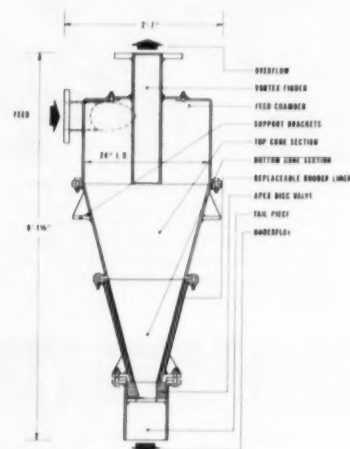
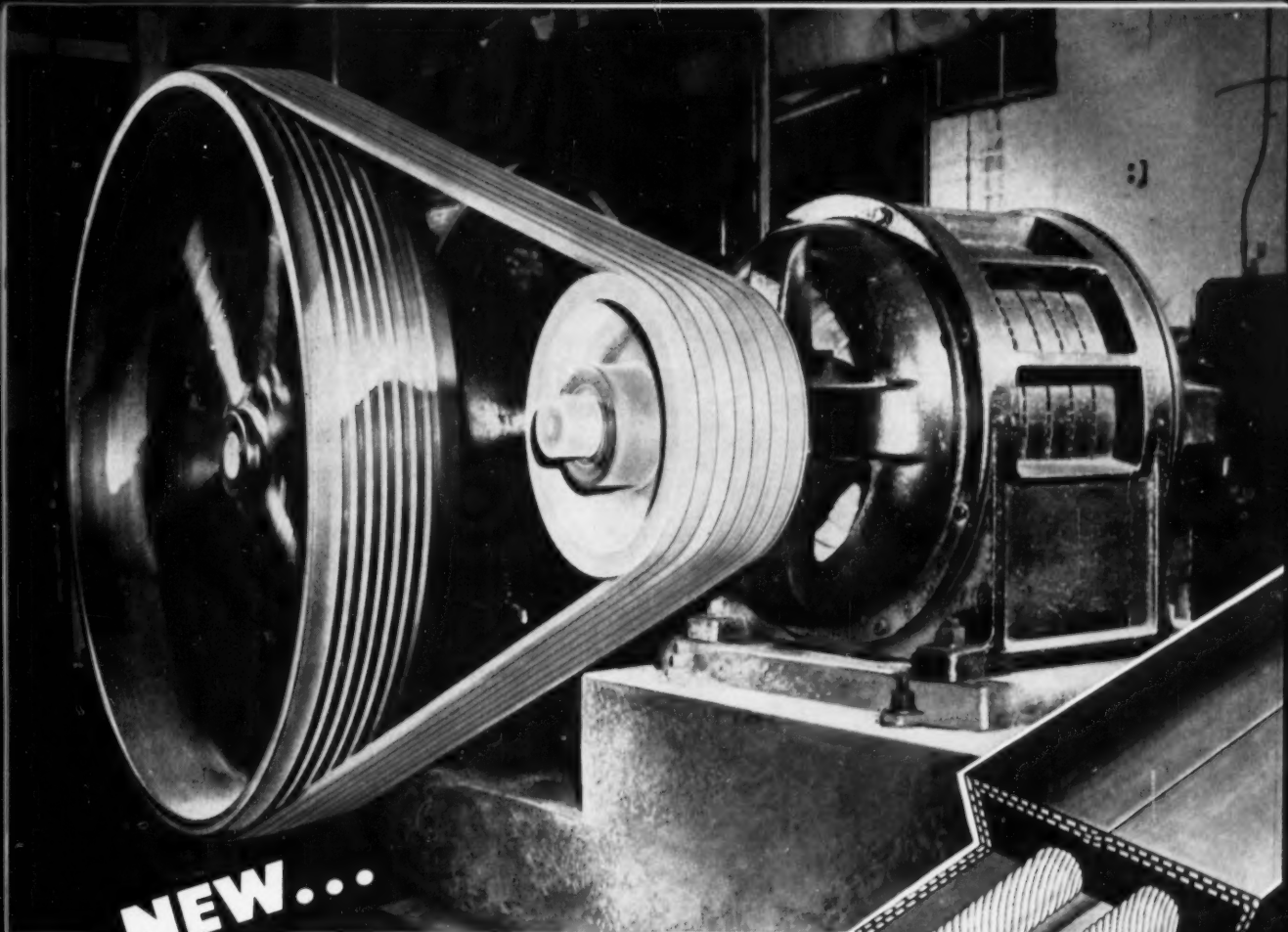


FIGURE 9.



Thermoid
Powerflex Hi-Capacity V-Belts
40% stronger
than standard belts!

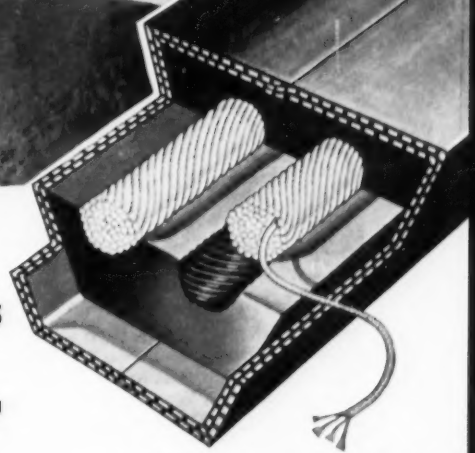
Where more driving power is called for, switch to Powerflex Hi-Capacity V-Belts. These new *premium* belts can step up the drive capacity of "under-belted" drives by as much as 40%.

If your present belts are being stretched beyond their take-up allowance... or if you're going to replace worn or damaged pulleys... change to Powerflex Hi-Capacity V-Belts. They permit you to use fewer belts and narrower sheaves... reduce drive costs.

Powerflex Hi-Capacity V-Belts are available in all standard sizes, and feature a special oil-resistant cover which prolongs belt life. Static conducting covers can be supplied. Order from your Thermoid Distributor, or write direct for complete information.



THERMOID COMPANY • Trenton, N. J.



There's a Thermoid Conveyor Belt



... and Thermoid Hose for every job.

"Capacities of modern paving ... through the use and USS TRI-TEN



THIS DUAL DRUM 34-E paver is one piece of equipment in the nearly \$4,000,000 machinery investment of the Texas Bitulithic Company. Other pieces include tractors, earthmovers, asphalt plants and trucks. "The weight of the machine is a compromise between the capacities wanted by the contractor and the conditions under which the machine is used," Mr. Ireland goes on to explain. "If larger drums meant extreme weight increases, the contractor would certainly experience more frequent breakdowns and expensive down time. Paving machines operate on steel caterpillar tracks. At present we can count on approximately 100 miles of paving operation before the tracks must be replaced, but each pound of weight added to the machine would shorten that track life—and tracks cost \$14,000 on the average."

MR. IRELAND gives more facts on the use of USS High Strength Steels in roadbuilding equipment. "Stress and vibration are not the only enemies of our equipment. We also have to contend with abrasion from dust and rock, impact of loads dumped into carriers from power shovels, trucks driving up and onto the scoops of concrete pavers, corrosion danger when operating in moist areas. The machines are operated from 10 to 24 hours per day, usually on an overload basis. The equipment must be constructed of the strongest metals available if we are to avoid breakdown and costly repairs. Our maintenance costs in 1956 totalled over \$800,000 in repairs and parts. We are naturally interested in any steel which increases the strength and the life of our machines."

Also ideally suited for roadbuilding equipment—USS "T-1" Steel, a construction alloy steel having a minimum yield strength of 90,000 psi.



equipment increased up to 300% of USS COR-TEN, USS MAN-TEN "E" HIGH STRENGTH STEELS,"

says **Mr. Frank R. Ireland**,
*General Superintendent, Paving and Earthmoving
Texas Bitulithic Company, Dallas, Texas*

"THESE ENLARGED CAPACITIES—without unwieldy, impractical weight increases—are possible because of the substitution of such weight-saving, high strength steels as USS COR-TEN, MAN-TEN and TRI-TEN "E" which replace the heavy cast irons and structural carbon steels used in the past. A machine must be light enough in weight to be practical for the job, and still large enough to handle the capacities demanded by modern volume construction schedules. I've been in this business for 25 years, and I've watched the gradual improvement of machinery over this period. Our newest paving machine weighs approximately the same as our old equipment, but we can now count on being able to handle three times the amount of concrete paving as compared to the volume of the past. We have on occasion finished a contract in one month, which would have required six months or more to finish in the past!

"High strength steels enable the paving machine manufacturers to turn out equipment provided with not just one, but two drums, and each drum is larger than the old-style single drum," continues Mr. Ireland. "The increased capacities also mean a bigger, heavier load for the machine to withstand. Weight reductions alone would mean nothing if the metal used did not stand up to the beating that accompanies the enlarged loads. We not only operate the machines at their rated capacities . . . we operate them with a 20% overload, which is necessary to remain competitive.

"Basically, the stronger, tougher steels such as USS COR-TEN, MAN-TEN and TRI-TEN "E" brands should be used in new equipment because they permit payload increases, faster speeds, and longer equipment life," concludes Mr. Ireland. "When a manufacturer can take 2600 to 2700 pounds off the dead weight of the



equipment, we can add another cubic yard of earth to the payload of an earthmover."

All three brands of USS High Strength Steel—USS COR-TEN, MAN-TEN and TRI-TEN "E"—have distinctive properties and each is recommended for certain end uses where its specific properties will assure longer service and greater over-all economy. All three steels have a yield point one-and-one-half times that of structural carbon steel and all enable greater strength and toughness to be built into vital parts of machinery.

Now Available. Our "Design Manual for High Strength Steels" contains comprehensive and practical information that you will find extremely useful in designing your product for greater economy and efficiency by the sound use of high strength steels. For your free copy, write on your company letterhead, giving your title or department, to United States Steel Corporation, Room 2801, 525 William Penn Place, Pittsburgh 30, Pa.

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UNITED STATES STEEL

PRODUCING AGGREGATES . . .

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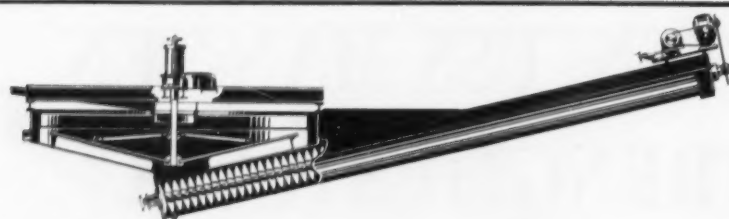


FIGURE 10.

HARDINGE PHOTO



PRIME-MOVER M30 FOR ENGINEERED CONSTRUCTION Hauls $\frac{2}{3}$ yard or 1-1/2 tons. Unloads transit mixers fast. Spots concrete right where it's needed on plant, warehouse, pier and bridge construction. Hydraulic Torque Converter Drive frees the operator from shifting, clutching and wasted effort. Rugged, dependable. Bucket and flat bed interchangeable.

M30

PRIME-MOVER

M15A

FOR HIGH VOLUME, LOW COST
PLACING OF CONCRETE AND
OTHER BULK MATERIALS—
USE PRIME-MOVER POWER!



PRIME-MOVER M15A FOR BUILDING CONSTRUCTION

The established method of placing materials on school, hospital, and commercial building projects. Places 12 to 17 cu. yds. of concrete per hour—without extensive preparation for its use. Runs on same type of ramps, hoists and runways as hand carts. Available with flatbed, or 10 cu. ft. bucket.

FOR DETAILS WRITE TO PRIME-MOVER CO., MUSCATINE, IOWA

lined (sometimes with rubber). It is fitted with a tangential feed pipe and an orifice plate supporting a vortex finder in the center near the top. The vortex finder may extend upward into an overflow chamber fitted with a tangential overflow pipe, or it may connect directly with a 90-deg elbow of somewhat larger diameter. Material to be recovered passes through an apex valve at the shell bottom. This may be a tire type (to be inflated with air or water to close its inner diameter) or a disc type (regulated manually).

Single cyclone units can handle up to 1,400 gpm depending on inlet pressure and desired mesh separation. The size of the mesh to be recovered is regulated by the size of opening or diameter of the apex valve. A 24-in. cyclone, with 4-in. slurry pump delivering feed at 18 to 20 psi, should be suitable for most sand applications to recover minus 100 mesh.

Other Sand Recovery Units

There are a number of other types of units for hydraulic preparation of sands. Those most likely to be used for producing construction sands in more or less specific instances are:

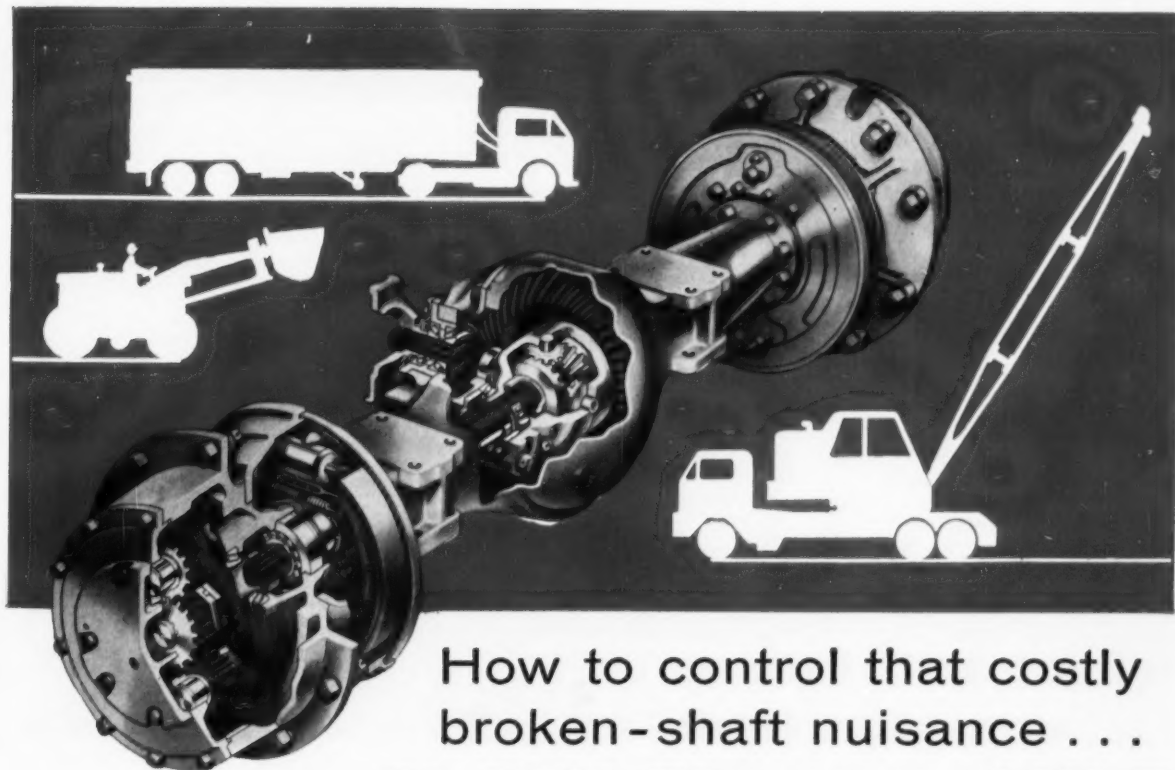
Hydro-Classifier, or Bowl Classifier—These units (Fig. 10 and 11) provide additional settling area at their feed end. They can handle large volumes of water and deliver a well drained, finished sand. Their primary function is the separation of sand in the extremely small mesh sizes.

Hydroseparator—Augmenting the hydro and bowl classifiers, this handles exceptionally large volumes of flow and makes a preliminary separation of sand and silt prior to final classification. Single units may handle as much as 1,000 tons of sand per hour. It is primarily a de-sliming unit without particular regard to separating efficiency.

In a hydro-classifier, the primary element of control is dilution—the higher the ratio of liquid to solid, the finer the overflow product. In a hydroseparator, however, the primary element of control is the velocity of flow—the more rapid the flow, the coarser the overflow product.

Thickener—This is a deep round settling tank. It continuously collects settled fine sedimentary sol-

continued on page 205



How to control that costly broken-shaft nuisance . . . **CLARK Planetary AXLE**

Check the extraordinary record of performance established by this axle—in the toughest service any axle is required to meet:

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- Tractor-Shovels, Bulldozers, other construction machines
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- Tandem-Drive Units for all applications

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Less weight—yet stronger—an astonishing fact: severest torque loads, typical of extreme off-highway service are handled easily by gears and shafts smaller in size and therefore considerably lighter in weight than conventionally designed axles of equal capacity.

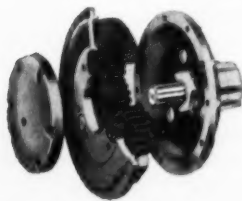
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Please send illustrated bulletin on the Clark Planetary Axle.

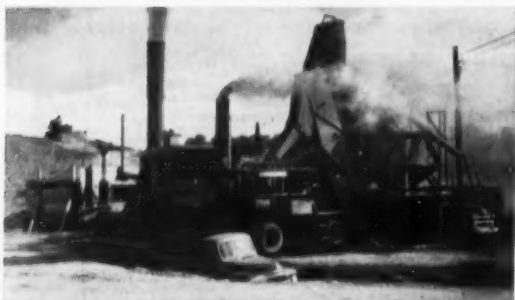
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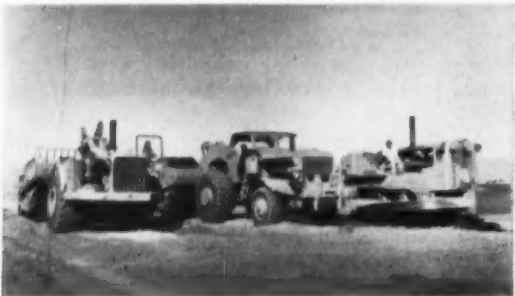
25 Years of Colorado Highway Work!



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More than 200,000 tons of surfacing material were produced by this Barber-Greene "hot mix" plant for Colorado highway 160.



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Leone Construction Company
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**IT'S PERFORMANCE
THAT COUNTS!**

PRODUCING AGGREGATES . . . continued

ids and conveys them to a central point of withdrawal. It receives overflows from classifiers and

hydroseparators, removes the silt and clay, and produces a clear effluent that may either be re-

turned to process or be discarded safely.

The thickener works best where the ratio of suspended solids to liquid is comparatively large and where the solids discharged will have as low a moisture content as is practicable. The major product is generally the underflow, which usually is handled by a discharge pump. Thickeners often take the place of settling ponds so the effluent can be reused in further sand processing. Frequently they are used to clear up the wash water so it can be discharged into a river or lake without pollution or the formation of deltas. **Fig. 12** shows an arrangement of rake and bowl classifiers, hydroseparators, and thickeners for the preparation of high specification sands for dam construction.

Plant Design

The design of wet operation plants poses problems beyond those encountered in dry operations. In dry operations of crushing and screening, the variables are fewer and control is more readily established. But in wet operations, which are mainly washing and sorting, there are additional factors to consider. There are water quantities and pressures, nozzle characteristics, grain sizes and specific gravities, liquid densities, particles in suspension, and overflow velocities—just to mention the more prominent. With these must go a fairly comprehensive understanding of the equipment units and their combinations most likely to produce the desired results.

Hydraulics in itself is a specialized phase of engineering. And when applied to the processing of minerals, including sand, it takes on the nature of specialization within specialization. This is not to say that a great many producers of washed aggregates have not been successful in spite of meager knowledge of the subject. However, the chances of failure can be considerably minimized if the would-be producer first avails himself of the "specialist services" most reputable manufacturers of wet processing equipment offer.

Further, bear in mind that the most ingenious or the most elaborate layout is not always necessary for the production of highly acceptable sand. In most instances, water is water. And the

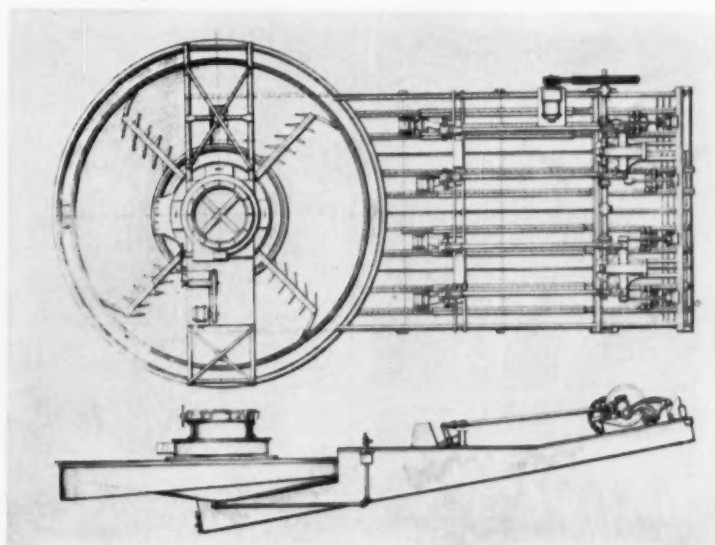


FIGURE 11.

DORR-OLIVER PHOTO

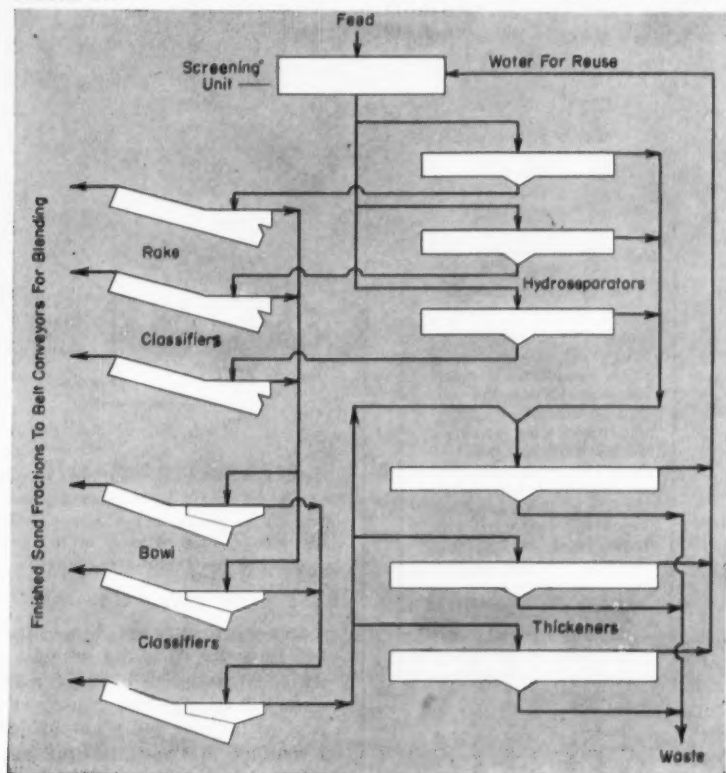


FIGURE 12.

DORR-OLIVER PH. TO

ON-THE-SPOT, high specification sand for dam construction . . . 2,200 tons per hour. Raw material screened and oversize removed. Three hydroseparators remove excess water and silt. Three rake classifiers operated in parallel receive hydroseparator underflows and classify out a finished, coarse fraction, which is conveyed to stock pile. Classifier overflows are fed to three bowl classifiers, which wash and separate three sharply-sized products for subsequent blending with coarse classifier product mentioned above. Thickeners clarify overflows from hydroseparators and final bowl classifier, and return water for re-use in the process.

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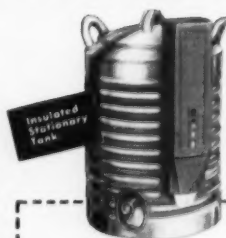
Constant safety reminders are an important part of every safety program. When they get read, the National Safety Council says, they do help reduce accidents. And you know how vital a good accident record is to your insurance costs.

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PRODUCING AGGREGATES . . . continued

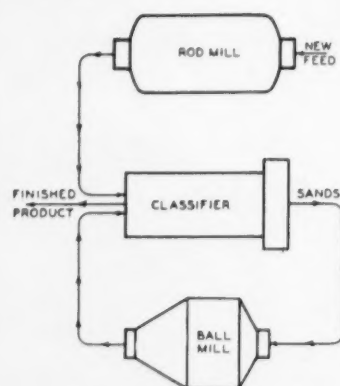


FIGURE 13—Primary Rod Mill discharge to classifier overflowing finished product. Classifier sands to ball mill in closed circuit with it.

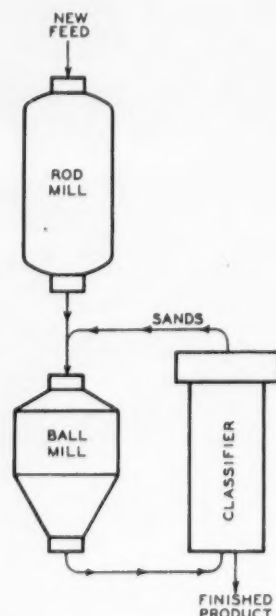


FIGURE 14—Primary Rod Mill in open circuit, grinding 6 to 20 mesh. Secondary ball mill in closed circuit with classifier. Any product from 48 mesh to 200 mesh, or finer, can be obtained as desired.

secret of a successful operation lies in controlling the amount of water required to produce a desired effect. For this reason it is best to lay out the plant in such a manner that the least probable amount of equipment will be installed. But design it so that additional units or types of equipment can be added, if need be.

Most importantly, do not plan your installation until after adequate testing and analysis of the raw material. It can very well

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ALLIS-CHALMERS

Engineering in Action

PRODUCING AGGREGATES ... continued

develop that some of the smaller sizes do not exist in adequate quantities to meet specification requirements. It may be that some other location should be considered. Or if this is not feasible, some of the sand fractions may have to be manufactured. The manufacture of sand is somewhat beyond the scope of washing and classifying fine materials. But it might be well to touch on the subject briefly in order to point to some of the methods and equipment available for this purpose.

Manufactured Sand

If the product is deficient in some of the larger or intermediate fractions, some of the product in the coarse size range (say $\frac{3}{4}$ -in.) might be processed. This would be put through a roll crusher or a cone crusher or, if not too abrasive, through a hammermill. Screening and wet classification and blending would follow. When the deficiency exists in the finer sizes (say from 16 mesh on down to 50 mesh) a rod mill may be required. If deficiency exists in fractions below 50 mesh down to 200 mesh, a ball mill may have to be considered.

Experience seems to favor a wet feed to the rod mill. This reduces rod and liner wear, theoretically gives better product control, and permits pumping the mill discharge back to a screen or to a ball mill in series with it. For the same reasons, preference is for a wet grinding operation in the ball mill. In addition, then the ball mill can be operated in closed circuit with a classifier. Fig. 13 and 14 show flow diagrams of rod mills and ball mills.

Fig. 15 is a flow sheet for one typical washed aggregates plant. Here all plus 3-in. gravel is reduced to crushed rock and 3-in. minus is processed as gravel and sand. Part of the $\frac{3}{8}$ x $\frac{1}{8}$ -in. gravel is reduced to manufactured sand in a rod mill. Three classifiers are used in the sand plant.

Fig. 16 is a flow sheet for an aggregates plant where gravel and quarry rock are combined because of a deficiency in 6 x 3-in. rock and in 16 to 30 mesh sand. The latter is made up from manufactured sand—a roll crusher produces $\frac{3}{4}$ -in. x No. 4 feed for a rod mill that turns out the 16 x 30 mesh sand. This is not offered as

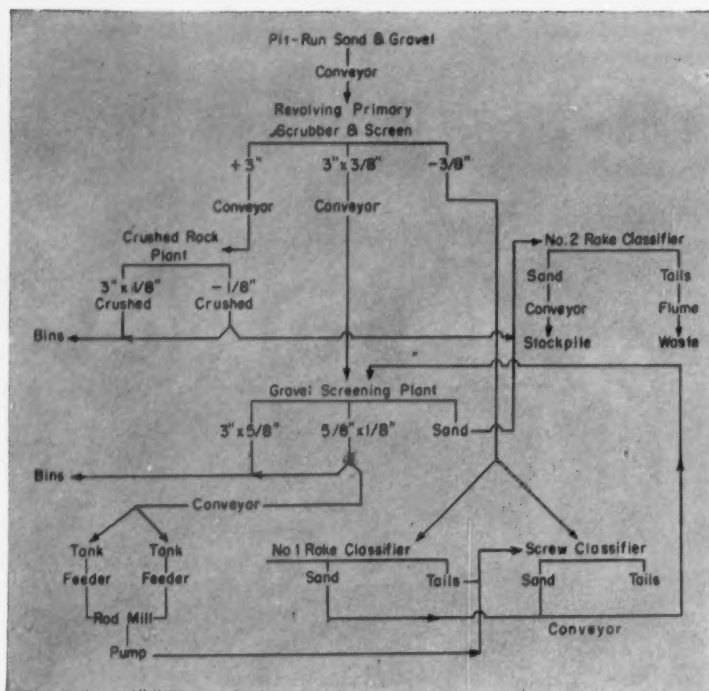


FIGURE 15.

the only solution to this problem. There may be a better way. It is a practical one, however, which is always of considerable concern to a producer.

Table III shows the quantities of each size product this plant (Fig. 16) must produce.

In this instance, the gravel pit analysis showed that the pit contained 75% gravel and 25% sand (3/16-in. minus). Specific data is shown in Table IV.

Table V shows the comparison. Note that the 9% retained on the No. 30 sieve falls short of the specified lower limit of 10% to be

retained. Hence the need to manufacture sand in the 16 to 30 mesh fraction. Further, more No. 8 to No. 16 could be recovered, but some of the minus 50 mesh would have to be wasted. Note the provisions for blending to obtain the ideal conditions.

continued on page 210

TABLE 4.
Pit Analysis (Gravel)

6-in. Plus	— 2%
6-in. to 3-in.	— 10%
3-in. to 1½-in.	— 27%
1½-in. to ¾-in.	— 28%
¾-in. to 3/16-in.	— 33%
	100%

TABLE 3.

Necessary Amounts Each Size (Cu Yd)

Max. Size Aggregate	6-in. Max.	3-in. Max.	1½-in. Max.	¾-in. Max.	Sand
6 in.	91,500	91,500	91,500	91,500	162,000
3 in.		27,100	27,100	36,100	45,000
1½ in.			8,500	10,500	12,600
¾ in.				3,100	2,500
Totals	91,500	118,600	127,100	141,200	222,100

TABLE 5.

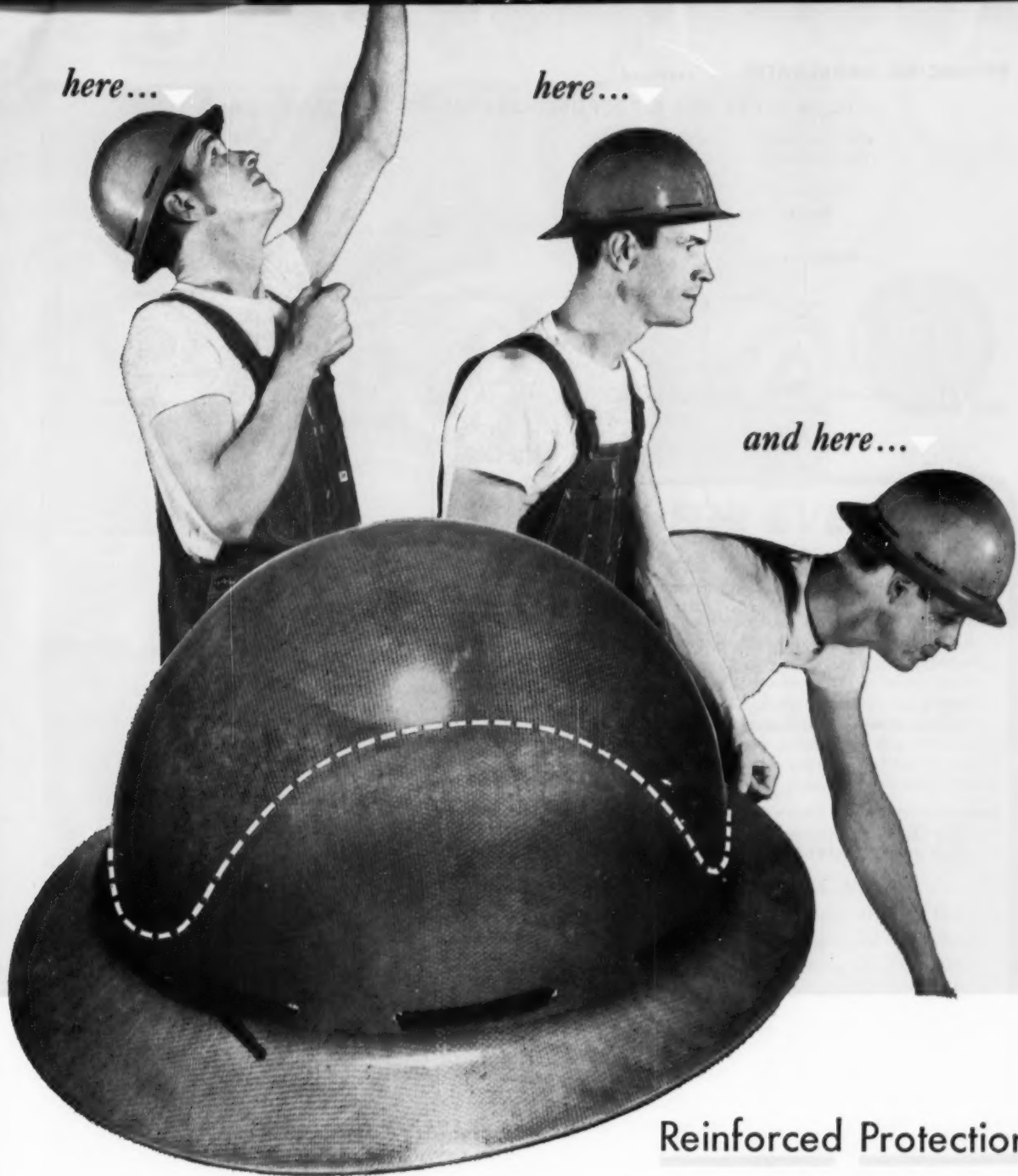
Pit Analysis Compared With Specification Limits

Size Retained	Pit	Specification	Ideal
No. 4	—	0 to 5%	—
No. 4 to No. 8	16%	5 to 20%	13%
No. 8 to No. 16	10%	10 to 20%	16%
No. 16 to No. 30	9%	10 to 30%	22%
No. 30 to No. 50	29%	15 to 35%	27%
No. 50 to No. 100	24%	12 to 20%	17%
Pan	12%	3 to 7%	5%
	100%		100%

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FLOW SHEET FOR A PROPOSED AGGREGATE AND SAND PLANT



pace with the accelerated highway construction program. If so, the necessity for producing manufactured sand will be accentuated. It behooves the producer, therefore, to become interested now in this subject if he expects

The next article in the series on Producing Aggregates will discuss maintenance of processing equipment.



Top Photo — T-700 GRADE-O-MATIC



Center Photo — Model 118 Bottom Photo — Model 503



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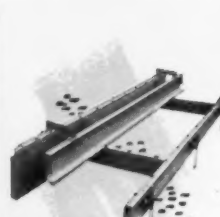
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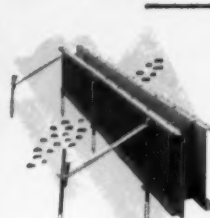
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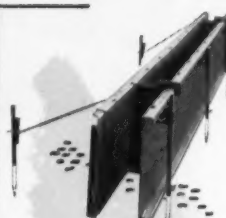
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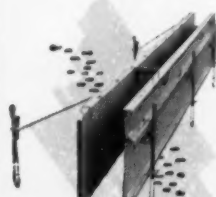
Curb and Gutter Forms



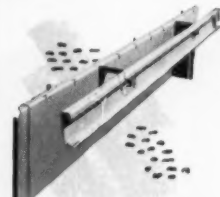
Curb Forms,
vertical back and face



Curb Forms vertical back
with battered face



Curb Forms,
battered exposed face



Integral Curb Forms



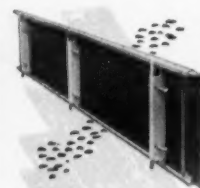
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What Research Means to American Business

American industry plans to invest \$150 billion in new plant and equipment during the next four years—more than in the five years 1952-1956. It plans to carry out this record investment even though manufacturing capacity has nearly doubled since World War II. These facts are reported in McGraw-Hill's tenth annual survey of Business' Plans for New Plants and Equipment. They contradict many long-established theories about investment in capital goods.

According to the textbooks, a high and rising level of capital investment is generally followed by a decline. The bigger the rise—so the old theory goes—the bigger the decline will be. But, after a decade of high-level investment and an especially strong rise in the past two years, industry now has plans to keep right on with near-record outlays for plant and equipment. Does this mean some new factor has been added, to change the investment cycle?

The New Factor—Research

The latest McGraw-Hill survey points out one new factor which, more than any other, is changing the nature of the investment process. This is the record outlay planned by U.S. corporations for scientific re-

search and development—to create new products and develop new industrial processes. The rapid growth of research in industry, and plans for even more remarkable growth in the years ahead, are shown by the accompanying table.

This year industry plans to spend \$7 billion on research and development—up 20% from 1956. By 1960 it will spend \$9 billion—enough to create a major new industry.

By 1960 manufacturing industry expects sales to be up 26%—with half the increase in products that were not made in 1956.

Growth of Research and Development Expenditures

(Millions of Dollars)

	1955	1956	PLANNED	
			1957	1960
Machinery	408	506	577	704
Electrical Equipment	950	1,149	1,310	1,637
Aircraft and Parts	1,038	1,558	2,274	3,161
Fabricated Metal Products and Ordnance	134	165	174	210
Professional and Scientific Instruments	185	252	300	453
Chemicals	440	498	528	617
Paper, Rubber, Stone, Clay and Glass Products	149	174	196	233
Petroleum Products	171	205	225	277
Other Manufacturing	1,038	1,279	1,388	1,557
Non-manufacturing industries	254	310	347	419
ALL INDUSTRIES	4,767	6,096	7,319	9,269

continued on next page

What Research Is Doing

Here are some examples of how industrial research is opening up new markets, or compelling the modernization of old facilities:

New automatic controls in petroleum refining will raise the quality of gasoline and reduce the time required for production. A new process for recovering oil from depleted wells promises to multiply our potential reserves.

A new process for treating iron ore will permit the ore to be fed directly into steel furnaces—without the need for blast furnaces or coke ovens.

New turbine engines—made possible by the development of heat-resistant alloys for turbine parts—offer greatly increased power for aircraft, ships and automobiles.

Altogether, industry plans to introduce more new products in 1957-1960 than in any previous four-year period. It also plans new processes on a scale that will make much of our present capacity obsolete. These new products and new processes are the secret behind continuing plans for high investment.

One-third of all manufacturing firms are building new plants this year to produce new products, and by 1960 this may account for 10% to 20% of all capital expenditures. At the same time, manufacturing companies report that over half their capital expenditures in the next four years will be for modernization of equipment and introduction of new processes. Thus the preponderant share of new investment will be based on developments growing out of research.

A New Kind of Prosperity

The keen interest of U. S. business firms in scientific research points the way to a new kind of prosperity for our economy—a prosperity based on deliberate creative-

ness. As long as we can create new products that will offer better value to consumers or cut costs to manufacturing firms, business will continue at a high level—not at fever pitch, perhaps, and it is to be hoped not at an inflationary pitch. But based on a steady stream of new products and processes, we can have a high level of general prosperity that defies the old laws of boom and bust.

It's Not Automatic

Of course, there is no guarantee. New products do not spring up by magic as the medieval alchemists hoped they would. They are found as the result of long and expensive effort in laboratories and pilot plants. This effort requires an increasing number of trained scientists and engineers. In 1957 alone, manufacturing companies report they will need 7% more of these highly trained people in research and development. And by 1960, they will need an additional 15% to carry out planned research programs.

The effort to maintain prosperity — as well as the national defense effort — will depend increasingly on this supply of scientific and technical personnel. But if we can supply the people, industry now has the plans for a research effort that will put an end to the spectre of idle plants and idle workers.

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**Lynn McMillen sold competitive units six years,
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If you've wondered what power unit salesmen would actually buy if they were in the rock products business, here's a clue.

Lynn McMillen, partner in McM Materials, Inc., St. Charles, Mo., states: "I sold competitive power units for six years, but this International UD-18A on our Cedar Rapids crusher is a good engine. We've had no major repairs on it in nearly two years' operation."

That's something to think about, an experienced engine salesman preferring a dependable International diesel when his profits depended upon production. And when you switch to Internationals you can choose from a full line of 16 diesel and carbureted power units—one for every job or driven machine. In addition to bonus-power, you'll get bonus-service from your always-available International Power Unit Distributor or Dealer. Call him soon.

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and 42° ground-level bucket roll-back!



machine job-capacity One-machine price!

loading performance. You get exclusive multi-purpose "carry-type scraper" action. You get production-boosting clamshell action. You get "radius-controlled" bulldozer action with big-yardage earth-rolling ability!

You get 4-In-1 versatility unlimited for a fraction of the price of the machines it can replace and outperform, on job after profitable job!

And you can have 4-In-1 advantages teamed with all-condition International crawler traction, or rubber-

tired Hough Payloader speed!

See your *International Distributor*—he's the only one who can offer you a 4-In-1 deal! He's the only one who can save you the thousands of dollars that 4-In-1 ownership assures—by giving 4-machine utility for one moderate investment. And he can prove the "heap of difference" in 4-In-1 performance on tracks or rubber—against anything else in the field! See him soon for a demonstration!

gives you...

Clamshell...

that "surrounds" loose materials and fills in one fast gulp—gives you "hopper-high," self-cleanout dumping action.



Bulldozer...

with clam lip up, and skid shoes on the ground, the radius-controlled blade rolls the earth with precision!



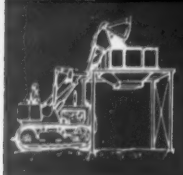
**ONLY YOUR
International distributor
CAN OFFER THESE
EXCLUSIVE FEATURES!**

**Here's
job-range**



**Exclusive triple-power
pry-action break-out**

Inbuilt ability to deliver tremendous excavating force enables this TD-9 4-In-1 to yank out deeply embedded old masonry piers. You see typical, on-the-job advantages of true and exclusive International Drott pry-over-shoe break-out action—the only design that gives you the three absolute essentials: (1) Full hydraulic power transfer from full piston-face power-push; (2) Long lever to apply full pry-power; (3) Fixed fulcrum of frame-mounted skid-shoes, to concentrate pry-force!



**Exclusive parallelogram
raise action**

No eccentric tipping to cause spill-back and lose yardage! The 4-In-1 has non-spill, roll-back level—all the way up. Compared to ordinary front-end loader performance, this feature, alone, can increase your daily yardage up to 18%! You can bottom-dump the 4-In-1 as a clamshell...and do it 2½-foot higher than ordinary roll-forward buckets. And bottom dumping eliminates the sticky materials problem—where other rigs foul up and can't get the job done!

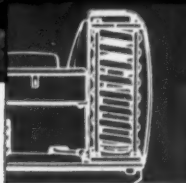
**Check these other famous
International Drott Exclusives!**

- **STANDARD EQUIPMENT.** Three-valve design, to provide hydraulic control power for attachments.
- **STANDARD EQUIPMENT.** Double-bottom, bridge-truss bucket to insure 4-In-1 strength to match pry-action.

- **STANDARD EQUIPMENT.** Yoke-type supports to insure linkage strength to back 4-In-1 capacity!
- **STANDARD EQUIPMENT.** Magnetized dip stick to prevent damage to hydraulic system from minute abrasives!

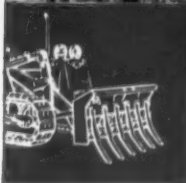
Only your International Distributor can offer you the big money-making advantages of International Drott exclusive 4-In-1 features. Only he can deliver you job versatility unlimited, in the world's only multi-purpose machine of its type! Prove to yourself that your correct size of 4-In-1 can replace and outperform a whole machinery yard full of limited-duty rigs. Ask for a demonstration!

where 4-in-1 gets world-beating capacity... stay-put performance!



Exclusive shock-swallowing Hydro-Spring

Capacity-boosting, machine-protecting Hydro-Spring is a hydraulic cylinder enclosed in a heavy-duty locomotive-type coil spring. Shock force displaces oil from main lift cylinders into the Hydro-Spring cylinder—extending it and compressing the big spring to absorb and cushion impact loads. Slamming the 4-In-1 bucket into hard material—'dozing frozen ground—dumping rock with a bang—you never worry! Hydro-Spring gentles trouble-causing forces by two-thirds or more—practically eliminates hydraulic hose failures!



Complete line of attachments

Job-getting, money-making attachments built for specialized duty, provide tree-grubbing, boulder-bucking, log-loading performance available only from International Drott equipment! Grubber Blade attachment, used in place of the 4-In-1, is shown applying the tremendous force of pry-action break-out—to uproot a tough old oak tree. Other special attachments built to extend International Drott advantages to other fields include: Rock Forks, Skid-Grapples[®], Bulldozer and Bullangledozer blades!

CHOOSE FROM

four 4-in-1 sizes

TRACTOR SIZE	4-IN-1 CAPACITY
TD-6	1-YARD
TD-9	1½-YARD
TD-14	2¼-YARD
TD-18	3-YARD



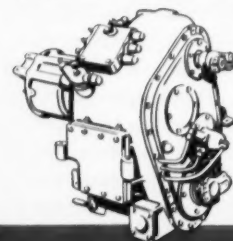
International Harvester Company, 180 N. Michigan Ave., Chicago 1, Ill.
Drott Manufacturing Corp., 3126 South 27th St., Milwaukee 15, Wis.

INTERNATIONAL[®] DROTT[®]

ONLY
your International distributor
can give you 4-in-1 Performance
ON RUBBER!



NO-STOP POWER SHIFT



One lever makes all shifts forward and reverse under full throttle — no clutching, no stopping. Torque converter provides infinite speed ratios.

PAYLOADER® mobility

PLUS four-machine utility

The only rubber-tired tractor-shovels available with Drott 4-in-1 buckets

Now you get even more tractor-shovel performance when you buy a "PAYLOADER". Equipped with a Drott 4-in-1 bucket, your "PAYLOADER" can handle many jobs that other wheeled tractor-shovels can't touch . . . perform shovel, clamshell, scraper or bulldozer work that would otherwise require several separate machines.

With a Drott 4-in-1 on a "PAYLOADER" you also get:

MOBILITY — quick-to-job travel over streets or highways under its own power . . . ability to work on or off paved surfaces.

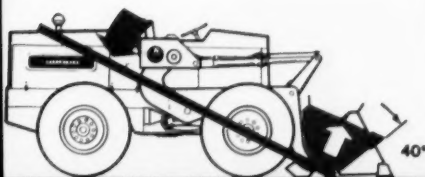
MANEUVERABILITY — easy operation and fast

loading cycles because of responsive rear-wheel power steering, "no-stop" finger-tip power shifting, dependable 4-wheel power brakes.

BALANCE AND STABILITY — long wheelbase . . . hydraulic load-shock-absorber . . . low, close bucket-carry position, all contribute to the easier riding qualities, the higher carrying speeds and the unusual balance that are outstanding "PAYLOADER" operating advantages.

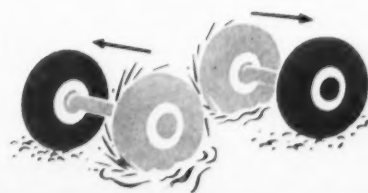
TRACTION AND DIGGING POWER — exclusive power-transfer differentials, planetary final drives and the powerful pry-out bucket digging action help these "PAYLOADER" units to outperform other tractor-shovels of comparable size. Your International Distributor is anxious to demonstrate what these "PAYLOADER" tractor-shovels with a Drott 4-in-1 bucket can do for you. Ask him about the "PAYLOADER" Deferred Payment Plan.

PRY-OUT DIGGING ACTION



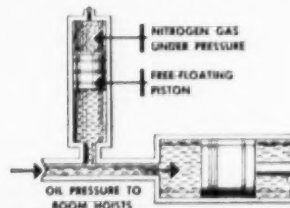
Exclusive "PAYLOADER" bucket action combines a powerful prying force over "break-out" pads, with 40° bucket tip-back at ground level to get heaped loads into bucket quickly and easily.

POWER-TRANSFER DIFFERENTIALS



These special differentials give better traction under all conditions—automatically deliver 25% more power to the wheels with the better traction.

LOAD SHOCK ABSORBER



This important device is a part of the hydraulic system. It cushions the loaded bucket, smooths the ride, permits faster carrying speeds, reduces spillage, boosts production.

All three sizes of 4-wheel-drive "PAYLOADER" tractor-shovels, models HU, HH and HO, are available with Drott 4-in-1 buckets; sizes 1, 1½ and 2¼ cu. yd. respectively.



PAYLOADER®

MANUFACTURED BY
THE FRANK G. HOUGH CO. LIBERTYVILLE, ILL.
SUBSIDIARY—INTERNATIONAL HARVESTER COMPANY



THE FRANK G. HOUGH CO.

706 Sunnyside Ave., Libertyville, Ill.

Send full data on 4-wheel-drive "PAYLOADER" model
() with Drott 4-in-1 bucket to:

Name _____

Title _____

Company _____

Street _____

City _____

State _____

90

Construction Men in the News...



FIRST "second generation" president of The Moles is Richard A. Johnson, newly elected to the post. His father, Arthur A. Johnson, was president of the organization in 1944.

The Moles Elect New Officers

RICHARD A. JOHNSON president of Arthur A. Johnson Corp. is the new president of The Moles, an association of tunneling and heavy construction engineers and executives. He succeeds Thomas J. Walsh, Jr., president of Walsh Construction Co. Walsh becomes chairman of next year's Moles Award Committee.

Johnson was elected at the Moles annual meeting in New York City. Other officers elected were: Howard A. Collins, president of Howard A. Collins Construction Co., first vice-president; Mansell L. MacLean of MacLean-Grove Co., Inc., second vice-president; Richard M. Johnsen of The Foundation Co., re-elected treasurer; Gilbert M. Serber, Stock Construction Co., re-elected secretary; and John A.

Lambert of McKiernan-Terry Corp., sergeant-at-arms.

Four men were elected to three-year trusteeships. They are: Eugene F. Gibbons of Raymond Concrete Pile Co.; Daniel M. Lazar of Cayuga Foundation Corp.; John Malcolm of J. Rich Steers, Inc., and Henry T. Perez, editor, Construction Methods and Equipment magazine.

Johnson is the first "second generation" president of The Moles. His father, Arthur A. Johnson, was president in 1944. Johnson joined his father's firm on graduation from Lafayette College in 1924. He started work as a foreman on the Central Park West subway then under construction by the company. He became president of the Johnson Co. in January, 1955.



ERWIN N. (PETE) ZINER, former safety engineer for the John A. Volpe Construction Co. of Malden, Mass., now heads his own building contracting firm, Ziner Construction Co., Malden.

Ziner had been with Volpe since his graduation from Northeastern University in 1948. He started as a field engineer and from 1952 to 1956 headed Volpe's safety program.

He is a member of the executive committee of the Massachusetts Safety Council, assistant secretary and executive committee member of the National Safety Council, and treasurer of the Boston Chapter, American Society of Safety Engineers.

KENNETH I. CROSIER will head the newly-created supervisory position of safety engineer for Kaiser Engineers, Oakland, Calif.

He will be primarily responsible for supervision and coordination of safety and accident prevention activities on all projects in the U.S. Crosier, who has 22 years experience in construction and industrial safety work, joined Kaiser in 1938 as safety inspector on Grand Coulee Dam. He has managed the company's safety activities on many major projects. While he was project safety engineer on the company's Idaho Engineering Test Reactor project, Kaiser won the first construction contractor's award ever presented by the state for working more than 1,000,000 man-hours without a lost-time injury.

ALEX H. HAWKINS becomes manager of the new El Paso, Tex., district office of Intrusion-Prepakt, Inc., Cleveland concrete construction and maintenance contractors.

Hawkins joined I-P in 1945 and since has been assigned to supervise many of the company's bigger projects including Jim Woodruff Dam, Texas Tower Radar Warning Station No. 2, and recently, the new Camden Drydock for New York Shipbuilding Corp.



E. G. ROBBINS (top) and FRANK L. WHITNEY (below) are newly elected members to the board of Walter Kidde Constructors, Inc., engineers and builders of New York and of Houston.

continued on page 225



NOW...boom pendant assemblies with full catalog strength of the wire rope

Rugged J&L boom pendant assemblies with exclusive JalKlamp splices provide extreme strength, longer service life.

JalKlamp terminals are formed by hydraulically pressing the alloy sleeve around the rope. The metal in the sleeve flows into every space between the wires and the strands of the rope. The splice is up to 20% stronger than conventional splices.

The solid steel fittings in J&L boom pendant assemblies are held tight in the loop. They cannot slip.

Investigate why J & L boom pendant assemblies last longer under toughest operating conditions. Send coupon today for complete information.



Jones & Laughlin

... a great name in steel

Jones & Laughlin Steel Corporation
Wire Rope Division
Muncy, Pennsylvania

☐ Please send information on
J&L boom pendant assemblies.

☐ Have representative call.

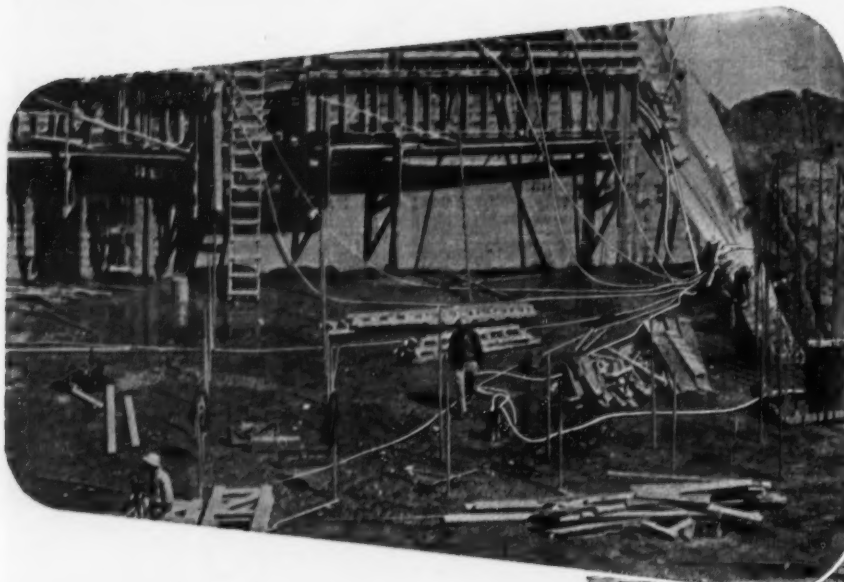
Name _____

Title _____

Company _____

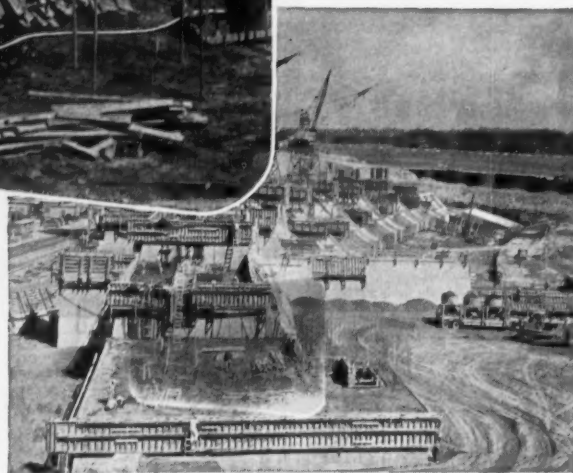
City _____ Zone _____

State _____



Gates construction hose is used extensively on one of world's largest engineering projects —the St. Lawrence Seaway.

The Gates Hose you want...when you want it!



Gates distributor stocks are quickly available everywhere, and you can be sure of getting the *right* hose for any construction job. Three of the most popular types are:

35B Gates General Purpose Water Hose for long life in rough service. A superior hose for all types of wet-down service . . . for concrete making . . . for discharge on small pumps.

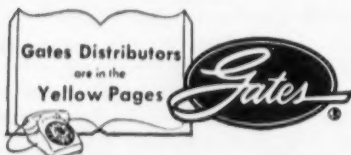
This hose is built especially for rough service under all kinds of weather conditions. And it won't chip or scuff off. High or pulsating water pressures are easily handled by Gates 35B. Extra long service life of this hose means money saved. Available in long continuous lengths . . . $\frac{1}{2}$ " through $1\frac{1}{2}$ " inside diameters.

39WW Gates Water Suction Hose withstands extremely rough usage.

An all-purpose heavy duty suction hose for use on intake side of any pump requiring hose up to 4" inside diameter. (Can also be used for discharge service.) Tough but flexible. Reinforcing wires and cords are interlaced to provide a strong, well balanced construction.

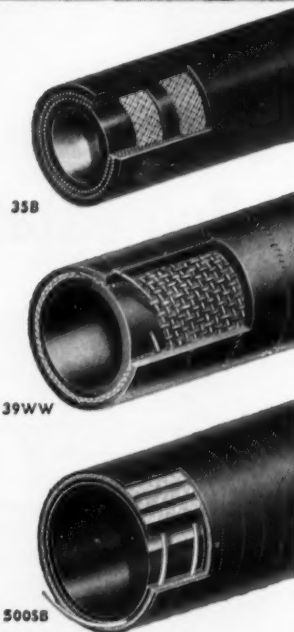
500SB Gates Heavy Duty Suction Hose with maximum crush resistance.

Recommended for use on 4", 5" and 6" centrifugal, diaphragm and piston type pumps, this heavy duty hose has rugged spring steel wire and strong fabric reinforcing to make it practically crush-proof. Tube is compounded to handle abrasive fluids such as those encountered in sewer work. Made with inside diameters from 2" to 6".



The Gates Rubber Company
Denver, Colorado

The Mark of *Specialized* Research



TPA 165

Gates Construction Hose

MEN IN THE NEWS...

continued

Robbins, a member of the organization for 30 years, is vice president in charge of construction. He is a graduate engineer. Whitney is vice president in charge of engineering. Prior to joining the firm in 1953 as chief engineer, he was eastern district chief engineer for the H. K. Ferguson Co.

LLOYD H. SHENEFELT, JR., is contracting manager for the Cincinnati District of American Bridge Division, United States Steel Corp. Shenefelt succeeds William H. Kann who retired after 43 years of service with American Bridge.

Shenefelt joined American in 1945 as a draftsman. The following year he was appointed assistant contracting manager for the Cincinnati district, the position he held prior to this appointment. During World War II he served in the Air Corps as a fighter pilot. He was discharged as a Captain in 1945.

I. E. BOBERG, chief engineer, is a new vice president of Chicago Bridge & Iron Co. Boberg, a graduate of the University of Illinois, joined the company in 1924. He left in 1927 to work as a consultant but returned within a few years to the firm's Chicago Engineering Department. In 1935 he became assistant to the chief engineer. During World War II he was in charge of all engineering and construction of floating dry docks at the company's Morgan City, La. yard. He was appointed the firm's chief engineer in May, 1945.

M. HERSCHEL PARSONS is a new vice president of Turner Construction Co. of New York. Parsons joined Turner in 1933 and has served as a general superintendent since 1944. He has been in charge of many important projects including the John Hancock Insurance Co. home office building in Boston and the Socony Mobil Building in New York City.

He will serve as a project executive in Turner's New York office.

DAVID PICKET, president of Gotham Construction Corp. of New York City, is the newly elected chairman of the board. He will remain as chief executive of the 25-year-old company.

continued on next page



3-WAY SOIL BLENDER!

Here's the one multi-purpose tool every contractor needs to speed his work and make him more money! Solving soil problems is a specialty of Rome Disk Plowing Harrows. Have you ever encountered these problems?

1 Dead, dry dirt on the fill that blades like ashes and packs like sawdust? Wet it down with your water trucks, then mix it deep with a Rome Disk Plowing Harrow to put it in good shape for specified compaction.

2 In-place materials to mix? Soil cement materials, stratas or lifts in fills can be readily turned into a compact, homogeneous fill by mixing and pulverizing with a Rome.

3 Too wet to work? Blend wet soil with dry materials, plow deep with a Rome Disk Plowing Harrow to dry out your fills and cuts.

See your Rome Dealer for complete details — he is also your Caterpillar Dealer.

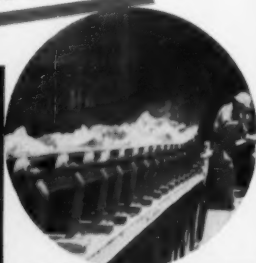
ROME PLOW COMPANY, Cedartown, Georgia

Rome Disk Plowing Harrows

REG. U. S. PAT. OFF.

GOODALL QUALITY MEANS *Belting at its Best!*

TO ASSURE *Important*
Savings IN OPERATING
AND REPLACEMENT COSTS



CONVEYOR BELTING

"SUPER TRIPLE-S"—Goodall's finest Conveyor Belting . . . for super-severe service. Built to handle crushed stone up to 10" and other highly abrasive bulk materials, wet or dry, particularly on long center hauls where tension is high and extreme flexibility is required. Weather-resistant cover. Tensile strength friction and other details determined by specific requirements.

"TRIPLE-S"—Designed for severe service but where weight of bulk material and length of carry do not demand "Super-S" quality. Recommended for crushed stone up to 6" or 8", abrasive ores, etc.

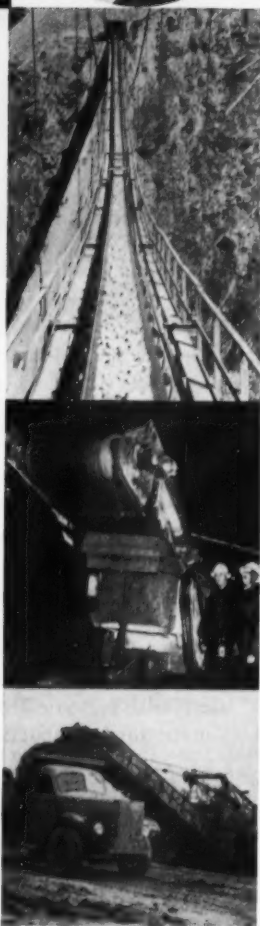
"LACROSSE"—A perfectly balanced, quality belt for all but the most severe conditions. Used for handling sand, shells, ashes, etc.

MUCKER BELTS

"WEAR KING"—Developed especially for use on Conway Mucking Shovels in tunnel excavating, and employed on most of the largest modern tunnel jobs.

GRADER BELTS

"76"—For many years, the Contractor's best assurance of long, trouble-free service on heavy-duty Elevator Road Graders.



"If it's GOODALL, it MUST be GOOD!"
Contact Our Nearest Branch for Details and Prices

Standard of Quality—Since 1870



HOSE • BELTING • FOOTWEAR • CLOTHING
AND OTHER INDUSTRIAL RUBBER PRODUCTS

GOODALL Rubber Company

GENERAL OFFICES, MILLS and EXPORT DIVISION, TRENTON, N. J.
BRANCHES AND DISTRIBUTORS THROUGHOUT THE UNITED STATES.
IN CANADA: GOODALL RUBBER CO. OF CANADA LTD., TORONTO.

MEN IN THE NEWS...

continued



E. WARREN BOWDEN is new executive vice president of Walter Kidde Constructors, Inc., engineers and builders.

He formerly was vice president of the firm. Bowden joined the company in 1943 as assistant to the president. He previously was associate engineer for the consulting firm of Parsons, Klapp, Brinckerhoff, and Douglas, New York. As assistant to the chief engineer, Port of New York Authority, before the consulting firm, Bowden took part in the construction of the George Washington Bridge, Bayonne Arch Bridge, Lincoln Tunnel, Tri-Borough Bridge, and the Bronx-Whitestone Bridge.

JAMES M. SPROUSE is the new manager of the Associated General Contractors of America's highway contractors division. He will be responsible for the association's activities in the expanded Federal highway program.

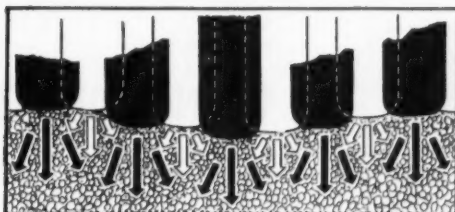
He succeeds Archie N. Carter, former manager of the division, who resigned to form his own engineering business. Assisting Sprouse will be FRANCIS E. TWISS, who was appointed engineer-advisor to the division, and DONALD A. BUZZEL, assistant manager.

Sprouse joined the association's staff in 1947 and became manager of the heavy construction and railroad contractor's division in 1953. He has served as secretary of the contractor forms, specifications and equipment expense committees.

Twiss is new to the staff but has extensive experience in engineering and highways. Buzzell has been a member of the AGC staff since 1953.



How oscillating wheels can save you untold street maintenance costs...



See the flow of compaction effort that the Bros Self-Propelled roller with torque converter drive provides for street seal coating, resurfacing and shallow lift compaction...

Here's how it is helping cities throughout the country make great savings in street maintenance costs:

- With full oscillation of all wheel pairs to provide uniform compaction, the Bros SP-54 helps "key" and "lock" aggregate materials tightly in the base course to prevent various pavement failures.
- Wheel oscillation of this roller also kneads the asphalt into a tight, solid surface, eliminating hairline cracks that would otherwise turn into

surface breaks. Very important, too, rubber tire rolling correctly imbeds the wearing course chips *without* crushing them.

- Besides such proven advantages, the Bros SP-54 offers these time-saving performance features: a torque converter drive provides smooth, easy handling and eliminates "tipping" of chips when starting; it also lessens drive line strain.

- Full-reversing type transmission with shuttle gear permits rolling in either direction without shifting; turn arounds are thus eliminated.

- Infinite speed range from 0 to 18 mph; positive chain drive to both rear wheel pairs; 50 HP engine and smooth, hydraulic steering provide fast, proper compaction results that you can't get from any other roller. See a Bros Distributor or write us for full information and/or a demonstration.

Find out, too, about the complete BROS TEAM. With the SP-54, the Bros Preparator and Roto-Mixer make the perfect combination for low cost street construction. The Preparator (in-place materials reducer) reduces native over-size materials and old blacktop to proper roadbed sizes. The Roto-Mixer stabilizes and blends the base and wearing course materials to improve load bearing values.



ROAD MACHINERY DIVISION

BROS INCORPORATED

(Formerly the WM. BROS BOILER & MFG. CO.)

1057 Tenth Ave. S.E. • Minneapolis 14, Minnesota





Quoting H.E. (ACE) GREEN, tunnel superintendent: "EIMCO 105 Excavators with heft to dig fast and overhead discharge, are the fastest tunnel loaders I've worked with."



The project was organized on a two cycle, 24 hour timetable with two drill and two mucking shifts. Here, Eimco 105 and dump wagons wait out blasting operations.

Quoting J. E. R. WOOD, president, NORTHWOOD INC.: "The fact that we have four EIMCO 105's is proof we're sure they promote high tonnage production."



WILKES-BARRE, PA. - Operator JOSEPH WEIKEL of Pottsville, Pa., prepares to unleash the EIMCO 105 Excavator's tremendous digging power during Bear Creek Diversion Tunnel operations. His comment: "It's the digginest machine I've operated."

The 19' circular bore was blasted through 1,150 feet of rock by NORTHWOOD INC. U.S. Army engineers directed the project.



EIMCO 105 SAVES TIME MUCKING FOR TUNNEL DRIVERS

"SAVES MINUTES EVERY CYCLE."

That's how AL AITKEN, V-P, NORTHWOOD INC., supervisor of Bear Creek Tunnel operations, describes the EIMCO 105 Excavator's performance.

Part of the \$18 million Bear Creek Reservoir Project, this tunnel will be outlet channel for the 234' high earthen dam. NORTHWOOD, with main offices in Vancouver B.C., is one of the Continent's active tunnel drivers.

Equipped with 1½ yard excavating bucket, the EIMCO 105 loaded 100 cubic yards of material into dump wagons after each blast.

Between 200 and 400 lbs. of dynamite, used in a 48-hole drilling and shooting pattern (usually fired in 10 stages of delay) produced an average advance of 7½' per round . . . 15' per day.

The tunnel was drilled to a bore size of 19' in the rough using 6 jack legs on a single deck jumbo. Concrete lining will reduce inside diameter to 16'. Six inch I-beam supports wedged tightly with wooden blocking are spaced every 4'. The EIMCO 105 now is taking up a 4' bottom left to provide flat surface for trucks.

NORTHWOOD'S high appraisal

of the EIMCO 105 is duplicated often in field reports from tunnel projects and mines throughout the world.

With any attachment - Excavator, Front-End Loader, Bulldozer, Fork Lift, and others -- EIMCO 105 owners get superior design . . . performance speed and power . . . operating ease and economy . . . versatile maneuverability . . . dependable service under hard usage.

Plan now to learn why you can shade your next bid and still keep the profit by figuring earthmoving costs around the EIMCO 105.

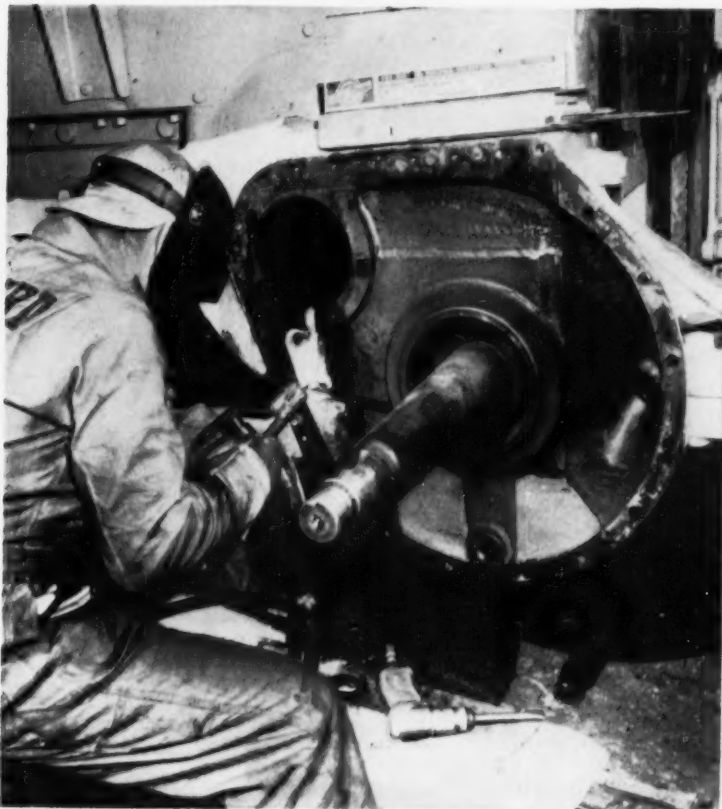
THE EIMCO CORPORATION
Salt Lake City, Utah—U.S.A. • Export Offices: Eimco Bldg., 52 South St., New York City

New York, N. Y. Chicago, Ill. San Francisco, Calif. El Paso, Tex. Birmingham, Ala. Duluth, Minn. Kellogg, Ida. Pittsburgh, Pa. Seattle, Wash.
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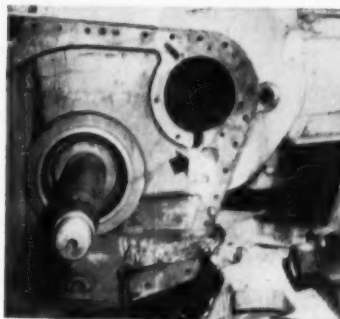


B 265

The Maintenance Shop...



TO MINIMIZE the danger of heat distortion, welder applies nickel-core electrode at 40 amps to badly cracked crawler tractor final drive housing.



CRACKS on the right casting have been flame-cleaned of grease and oil and cleared with a pneumatic chipper. One welding pass has been made.

Low Amperage Arc Welding Repairs Cracked Castings

A LOW-AMPERAGE arc welding technique lowers the cost of repairing cracked iron castings from earthmoving equipment for a West Coast distributor. Unlike the more elaborate preparations necessary for brazing, cracked castings are not removed entirely

from their rigs and preheating is not required.

Shepherd Machinery Co. of Los Angeles first tried to weld big iron castings two years ago. Their early attempts were unsatisfactory, principally because underbead cracking caused leaks, and

the completed weld lacked strength.

The method Shepherd now employs was suggested by Pakco Welding Supply Co., a local distributor. Repairing a badly cracked final drive housing from a crawler tractor (left) is a typical application of the cost-saving method.

Because of the size and extent of the cracks on both the left and right casting, the electrode had to give maximum penetration, and it had to be applied at low amperage to minimize the danger of distortion resulting from excessive heat buildup. Shepherd used an All-State 3/32-in. nickel-core electrode that can be applied at only 40 amps. This electrode had the added advantages of being fully machineable and practically spatter-free.

The electrode takes either ac or dc current, but dc reverse polarity was decided upon because it gives better penetration at a low amperage setting.

To get the area as clean as possible before welding, the operator used a pneumatic chipper to vee the cracks. After surface dirt was removed, he burned off all remaining oil or grease deposits with an air-acetylene flame set to 700 deg. Normal line-up and clamping procedures followed.

To bond the cracks, the welder alternated passes between the breaks as a precautionary measure against distortion, but because of the low amperage setting this probably was not necessary. Welds were peened between passes, and the slight flux residues were easily removed with a wire brush. Five pounds of the electrode completed the job.

The entire cost of the arc welding process on the castings—including the cost of partial disassembly, consumed supplies, and labor—was \$335. The tractor final drive housing would have cost more than \$1,600 to replace, and brazing would have been expensive and time-consuming because the casting would have to be taken from the tractor and preheated.

Turn the page



ACCUMULATOR installed between lift truck's mast and pipe guards, cushions the load by absorbing lift cylinder circuit shocks.

The device, which also can be used on loaders, cuts down on front-end wear and allows higher travel speeds with less spillage.

Shock Absorbers Cut Lift Cylinder Wear

THE ADDITION of a simple, easy-to-install hydraulic shock-absorbing device has virtually eliminated lift cylinder failures for a concrete block manufacturer who operates a fleet of fork lift trucks year round over a 26-acre outdoor storage area.

The attachment is a bladder-type, hydro-pneumatic accumulator consisting of a small steel shell containing a rubber bag pre-charged with an inert gas, usually nitrogen. A mechanic can connect the device into the hydraulic line between the control valve and the lift cylinder in a short time.

Developed by Greer Hydraulics, Inc., of Jamaica, N.Y., for aircraft hydraulic systems, the accumulators are standard equipment on many of the larger capacity lift trucks and tractor shovels. Now Greer produces accumulators—and all the accessories necessary for installation and servicing—in kit form for small and medium-sized hydraulically controlled fork lifts and front-end loaders. Larger sizes are available for big capacity units.

Best Block Co. of Metuchen, N.J., operates a fleet of Towmotor LT-60 fork lifts, which normally carry loads of about 3,000 lb over its 26-acre yard. Besides reduc-

ing wear and tear on the front-end assemblies in general and on lift cylinders in particular, the accumulators have raised the average travel speed of loaded fork lifts as much as 80%; have cut down drastically on load breakage and spillage; and have added considerably to the operators' safety and comfort. The accumulators, including installation, cost the company about \$100 each.

The bag-type accumulator acts on a simple hydraulic principle. At rest, the precharged bag fills the shell. Any impact against the hydraulic fluid in the circuit—such as that normally caused by lifting or lowering the load, or by traveling—forces hydraulic fluid into the shell so that it compresses the gas in the bag. This cushions the load and takes heavy stress and strain off the main lift cylinder and the entire front-end assembly.

To handle the 3,000-lb loads carried by Best Block's trucks, 1-gal. accumulators, charged before installation to 350 psi, are used. The accumulators come with brackets, a valve, tee connection, and necessary lines. The only maintenance equipment needed is a bottle of dry nitrogen and a charging and gaging assembly to keep the bag at proper pressure.



DEVICE consists of small steel shell containing a nitrogen-filled rubber bag. It connects easily into the hydraulic line between control valve and lift cylinder.

ENGINEER'S FIELD REPORT

PRODUCT

RPM DELO OIL

FIRM

M. M. SUNDT
CONSTRUCTION CO.
Tucson, Arizona

RPM DELO OIL ends 5 years of engine troubles



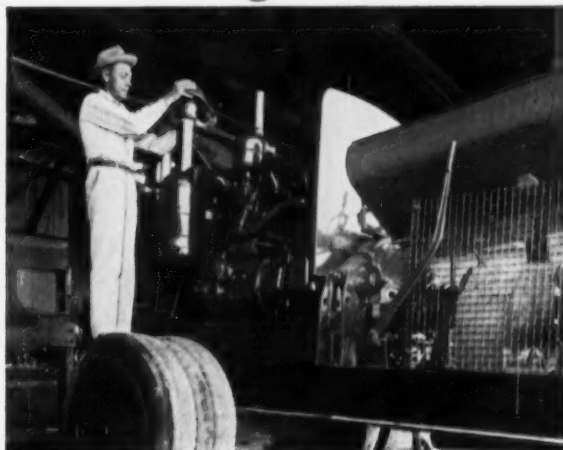
The pan has never been off the Caterpillar D7 engine of this Link-Belt Speeder shovel in 7 years, using RPM DELO Oil. Only repair was a single valve job—no other parts replaced. William Naumann, Sundt's Operations Manager, says, "We tried nine different major brands of oil in five years, trying to lick the frequent breakdowns that slowed our operations. Sometimes, main and rod bearings even froze solid on the crankshaft. We changed to RPM DELO Oil seven years ago, and, since then, have never had any engine troubles due to oil failure. We now use RPM DELO Oil exclusively in our 22 heavy-duty engines."



For More Information on this product contact your Standard Engineer or Representative, or write Standard Oil Company of California, 225 Bush Street, San Francisco 20, California

TRADEMARK "RPM DELO" AND DESIGN REG. U.S. PAT. OFF.

STANDARD OIL COMPANY OF CALIFORNIA, San Francisco 20
THE CALIFORNIA OIL COMPANY, Perth Amboy, New Jersey



Lubricated with RPM DELO Oil, this Caterpillar D 13000 portable unit powered a rock crusher of M. M. Sundt Construction Co. for a total of 8976 hours before overhaul. "In spite of extremely dusty conditions the only time the engine was touched was to replace a head—no other repairs were necessary," reports master mechanic Billy Gray, shown replacing air cleaner on unit following overhaul.



Austin 101 rock crusher, powered by Caterpillar unit described above, works 20 hours a day at firm's materials stockpile outside Tucson. Company works year around on road paving, grading, foundations, building construction.

Why RPM DELO Oils reduce wear —prolong engine life



● Oil stays on engine parts—hot or cold, running or idle ● Anti-oxidant resists lacquer formation ● Detergent keeps parts clean ● Special compounds prevent corrosion of bearings ● Inhibitor resists crankcase foaming

STANDARD OIL COMPANY OF TEXAS, El Paso
THE CALIFORNIA COMPANY, Denver 1, Colorado



Yes, it's true! Contractors

Saves handling and moving time

Equipment-Superintendent Herb Wagner of the James McHugh Construction Co., Chicago, says this about the SKIL Motor-Generator Radial Saw: "One of the handiest tools on the grounds. It's power-plus on wheels. Can be moved at a moment's notice to any spot. It has plenty of guts for all of our cutting needs. It's the perfect saw for large construction—adaptable and versatile—a must for construction areas where power is always a problem."

Made only by SKIL Corporation, Chicago 30, Illinois. Factory branches in all leading cities.



Each SKIL Saw pays for itself

Noel Shafer of Frank Messer & Sons, Inc., Cincinnati, says this about his power saws: "I have tried them all, but a SKIL Saw is lighter, better balanced and has plenty of power. We use them 8 hours a day, 6 days a week through rough material filled with concrete, nails and dirt. Each SKIL Saw we get pays for itself within a couple of weeks of continuous hard use. *It's the best saw on the market.*"



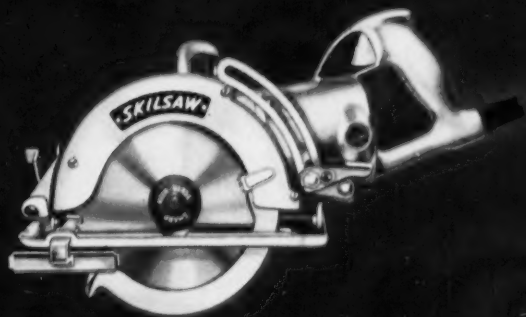
Saves taxpayers money

"Our SKIL Saw has more than paid for itself after only three months of use," says Mr. Ed Garland, Supt. of Maintenance of the Huey Long Bridge Sub-Dept., New Orleans. "By using the SKIL Saw we eliminated the cost of material handling and any farming out for cutting. We use it wherever it is needed. It does everything that we have asked and then some. It has saved our department time and headaches—and the taxpayers money."



Saves work and effort

"To push from a rear handle saw on heavy construction work is much easier than top handle saws," says Mr. Joe Browning, superintendent of the H. D. Tousley Co. Inc. of Indianapolis. "We have at times tried several makes, but none compare with SKIL Saws. They are the easiest to handle. I have seven saws on this project and they are all SKIL. They give us top-notch performance."



YOU, TOO, CAN SAVE

SKIL 7 1/4" Model 77 Saw above saves on every heavy construction job. Saves time, money, maintenance. The standard in general construction for all-around use. No matter what you have to cut, plane, sand or rout, there's a SKIL tool that can do the job faster, better, cheaper. Let your SKIL distributor show you why. Or use the coupon for more information.

always SAVE with SKIL Tools

Send for FREE booklet
on power tools.

SKIL
PORTABLE TOOLS



SKIL Corporation, Dept. CM-67
5033 Elston Avenue
Chicago 30, Illinois

In Canada:
3601 Dundas Street West
Toronto 9, Ontario

____ Please send me FREE booklet on SKIL power tools

____ Please send me name of nearest distributor

Name _____ Title _____

Company _____

Street _____

City _____ Zone _____ State _____

TORQMATIC brings nonstop push to tractors



You wouldn't believe it to look at one, but a tractor needs the smooth, precision nimbleness of a ballerina.

On that score, *TORQMATIC delivers*. In pushing, pulling, turning and reversing, *TORQMATIC* provides a constant, smooth, almost rhythmic flow of power.

With just a flick of the finger, your operator can full-power shift to the right gear without losing the "push" for even an instant.

Three speeds forward, three speeds reverse make a *TORQMATIC* tractor the most versatile tool of any contractor.

For bulldozing, loading, digging and you name it, take a tip from 55 manufacturers of 122 different kinds of road-building and construction equipment. Get the Allison *TORQMATIC* story.

Ask your equipment dealer, or write:

Allison Division of General Motors, Box 894T
Indianapolis 6, Indiana

NO. 3 IN A SERIES
ON SPEEDING AMERICA'S
ROAD-BUILDING PROGRAM



Allison

TORQMATIC DRIVES

Sales and Service

Equipment purchasing and servicing takes less time when you know who and where to call. Keep advised of new distributors, sales personnel and other activities.

Distributor Appointments

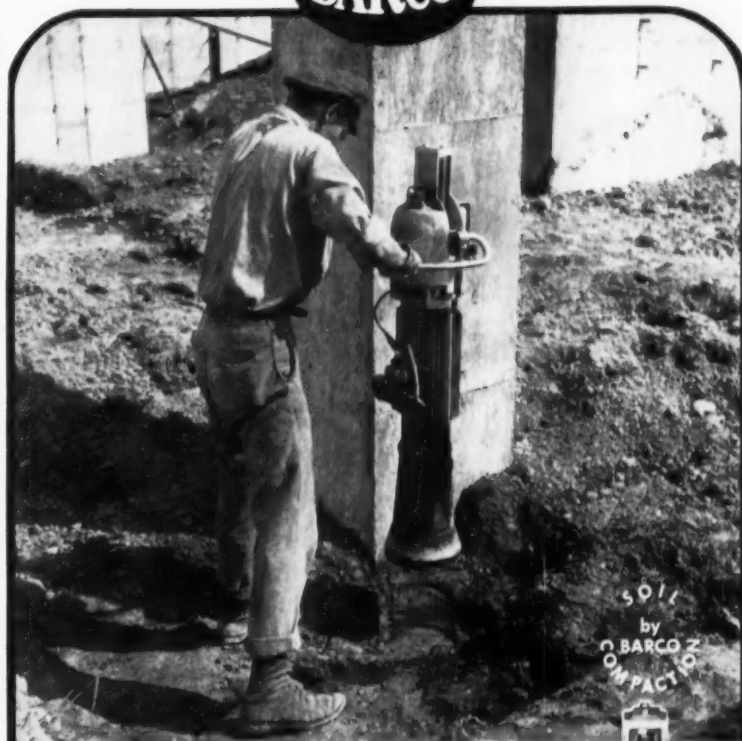
Bucyrus-Erie Co.: Eastern Tractor & Equipment Co., of Portland, Me., now offers sales and service facilities for Bucyrus-Erie excavators and cranes in Maine. The Portland firm will handle the full line of $\frac{3}{8}$ to 4-yd excavators and cranes; 15, 25, and 35-ton transit cranes; 5 and 10-ton truck-mounted hydraulic Hydrocranes; and dragline buckets.

Buffalo-Springfield Co.: J. W. Bartholow Machinery Co., Dallas, Tex., has been appointed distributor for Buffalo-Springfield rollers and compaction equipment. The distributor has been handling various lines of equipment since 1920. Other new Buffalo-Springfield distributors include Frantz Equipment Co., Philadelphia, Pa.; Dalrymple Equipment Co., Amory Miss., for Mississippi, Arkansas, and Western Tennessee; and R. B. Wing & Son, Albany, N.Y., for 15 counties in eastern New York state.

Joy Manufacturing Co.: Chiles Tractor and Machinery Co., Springfield, Mo., has been named a distributor of Joy construction equipment. The Chiles organization will sell and service Joy equipment in southwest Missouri and in three counties in southeast Kansas.

Standard Steel Corp.: Eighteen new dealer appointments were announced at Standard Steel's annual sales meeting, held April 15-18 at Palm Springs, Calif. The new dealers are: Armstrong Equipment Co., Birmingham, Ala.; James H. Hope, Sacramento, Calif.; K. C. Diesel Power Co., North Kansas City, Mo.; J. E. Snider, Gardiner, Me.; Highway Equipment & Supply Co., Lincoln, Neb.; Central New York Equipment Co., Inc., Syracuse, N. Y.; Contractors Sales Co., Inc., Albany, N. Y.; Constructors Equipment Corp., Philadelphia,

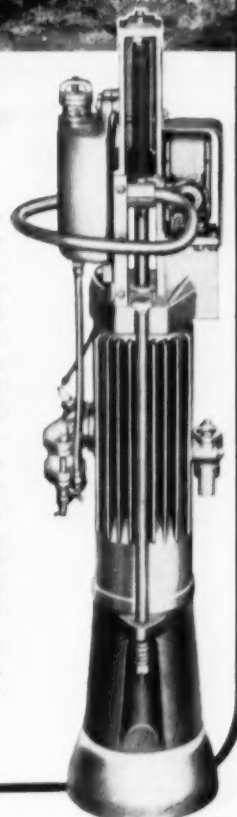
GASOLINE **BARCO** RAMMER



Barco Performance Pays Dividends!

Job Finished on Time!—When project specifications call for SOIL COMPACTION, Barco performance can't be beat! In test after test, Barco Rammers have demonstrated their ability to deliver 95% to 97.5% compaction (modified Proctor Method)—RAPIDLY! EFFICIENTLY! ECONOMICALLY! The Barco Rammer is especially effective for compacting fill in restricted areas—close to walls, culverts, abutments, around footings, and in trenches—on all kinds of construction jobs: Atomic Energy, Air Bases, Hydroelectric Power and Flood Control Dams, Highways, Toll Roads and Freeways, Bridges, Buildings, and Housing Developments. On area tamping, one man can average 20 to 30 cubic yards of fill per hour. On trench backfill, using lifts up to 24", the rate for 18" trench is 360 to 600 feet per hour.

Ask for a Demonstration!—We will be glad to arrange a demonstration for you; see our nearest distributor or write. SEND FOR A COPY OF CATALOG 621.



BARCO *Manufacturing Co.*
512-G Hough Street • Barrington, Illinois



- Blade pitch adjustable in motion.
- Safety throttle control to idle engine if machine gets away from operator.
- Sufficient weight to hard trowel—90 lbs.
- Sufficient power—2.2 H.P. Briggs and Stratton engine.
- Combination blades for float and finish.

**A NEW TROWELER
FOR SMALL BUILDERS**

SMALL ENOUGH
FOR ONE MAN
TO CARRY
THROUGH
A DOOR

Also available (not illustrated) the popular **WHITE T-1** 36-inch troweler with retractable wheel. One man portability! Write today.

White

Write White Manufacturing Company for free circular
ELKHART 6, INDIANA

Welds.... runs tools and lights!

No contractor can afford to be without this valuable 2 in 1 unit that gives you welding current anywhere for maintenance repair and construction—and with the flip of a switch gives you 110 volt AC current for tools, lights, motors. Your own men can use—you save hundreds of dollars by doing your own repair work—by having current available for welding or power when and where you need it. Coupon brings complete information—no obligation. **HOBART BROS. CO., Box 667, TROY, OHIO.**

... take it
ANYWHERE!

This handy
HOBART Welder
KEEPS JOBS MOVING



250 amp. "Contractors Special"
"Husky Boy" Air Cooled

HOBART BROS. CO., Box 667, Troy, Ohio
Without obligation, send complete information on items checked:

- amp. capacity
☐ AC Welder-AC Power Combination
☐ "Contractor's Special" engine drive
☐ "Husky Boy" Air Cooled DC Welder

Name _____ Position _____

Firm _____

Address _____



AC welder-AC power combination

Hobart "One of the world's largest
builders of Arc Welding Equipment."

SALES AND SERVICE...

continued

Pa.; Osborne Equipment Co., Knoxville, Ky.; Texas Machinery & Equipment Co., Amarillo, Tex.; Wheeler-Kershaw Co., Salt Lake City, Utah; Municipal Sales Co., Richmond, Va.; Craig Taylor Equipment & Supply Co., Anchorage, Alaska; Starline Equipment Co., Boise, Idaho; Borchert-Ingersoll, Inc., St. Paul, Minn.; The George F. Smith Co., Inc., St. Louis, Mo.; Melvin Pine & Co., Inc., New York, N. Y.; and Equipos Industriales y Agricolas, S.A., Mexico, D.F.

Yale & Towne Mfg. Co.: Present negotiations are expected to lead to the acquisition of the business and net assets of the Contractors Machinery Co., Inc., of Batavia, N.Y., according to a company announcement. Contractors Machinery Co. produces the Trojan line of four-wheel and two-wheel drive front-end loaders, as well as a line of sheepsfoot rollers and snow plows. The corporation being acquired will operate as the Contractors Machinery Div. of Yale & Towne.

Gradall Div., Warner & Swasey Co.: Construction Equipment and Supply Co., Albuquerque, is the new Gradall distributor for new Mexico. Other recent Gradall distributor appointments include Fehrs Tractor and Equipment Co., Omaha, for several Nebraska counties; Construction Equipment Co., Ltd., Vancouver, British Columbia, for Alberta, Saskatchewan, British Columbia, and the Yukon; and U.S.I. International, Div. of U.S. Industries, Inc., for Hawaii.

On the Sales Front

David White Instrument Co.: Roy Boehringer and John Forsdick have been appointed district sales managers for David White, manufacturers of surveying instruments. Boehringer will operate out of Euclid, Ohio, and Forsdick's office will be at Framingham, Mass.

Boston Woven Hose & Rubber Co.: R. H. Jackson, director of sales, has announced personnel and geographical changes in the company's sales divisions. Charles W. Kline, formerly New England division manager, will become western division manager, with offices in Los Angeles. C. E. Hanson, formerly west central division manager,

These two Allis-Chalmers HD-21 Tractors—which net 200 cu. yds. per hour on an uphill haul for Grannis & Sloane, Inc., Fayetteville, North Carolina—are equipped with A-C Torque Converter Drive, standardizing on Twin Disc Torque Converter components.



"Torque Converter tractors net us 200 cu. yds. per hour ...and the haul is uphill all the way!"

That's the report from Fred Hauck, hard-working superintendent of Grannis & Sloane, Inc., Fayetteville, North Carolina.

He's talking about two Allis-Chalmers HD-21 tractors, working on a 3,800,000-cu. yd. grading and excavation job at Duke Power Company's new Plant Allen in Belmont, North Carolina.

They're used to push-load motorized scrapers in making a 6300 ft.-long discharge canal—a 2,200,000-cu. yd., *uphill* earthmoving job. With the torque converter-equipped tractors, Mr. Hauck is hitting well over 200 cu. yds. per hour on a 1500-ft., one-way haul—most of it on a 5% *uphill* grade out of the canal.

"These HD-21's, with torque converters," says Mr. Hauck, "have made one of the roughest jobs we've ever

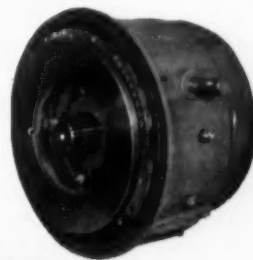
tackled much easier. They've saved us a lot of time and money."

Torque converter drive offers *you higher work output in less time, and longer equipment life* because it matches power to load demand, *automatically*, thus minimizing or eliminating gear shifting . . . it *eliminates* harmful engine lugging and stalling . . . it *cushions out*—through fluid connection—overloads, shock loads and vibrations—providing *longer tractor life with less maintenance*.

For these reasons, Allis-Chalmers designed torque converter drive into the HD-21, as standard equipment (it is optional on the HD-16). Since the inception of torque converters in crawler tractors in 1940, Allis-Chalmers has *standardized* on Twin Disc Torque Converter components.

Specify a torque converter for your

next HD-16. For details on Twin Disc Torque Converters—*single-stage and three-stage*—request Bulletins 508 and 135-E, respectively.



TWIN DISC CLUTCH COMPANY, Racine, Wisconsin • HYDRAULIC DIVISION, Rockford, Illinois

BRANCHES OR SALES ENGINEERING OFFICES: CLEVELAND • DALLAS • DETROIT • LOS ANGELES • NEWARK • NEW ORLEANS • TULSA



(Based on Company File # 9A003123)

The ground gave way

...but our Hartford Contractors' Equipment policy gave us the solid protection we needed!

Just as we were inching our crane around the pilings on a river bank, the ground gave way...

Of course the accident *would* happen to a brand-new rig! We'd had it less than six weeks. And there it was — wrecked.

I called my Hartford Agent. He set my mind at rest immediately. He reminded me of the automatic 45-day protection we had on new equipment under our Hartford policy. And he had an adjuster on the job in a matter of hours.

There wasn't any red tape. Not a bit! We repaired the crane. The Hartford Fire Insurance Company promptly paid us \$3,232.10.

Your investment in equipment ties up a lot of your money. Too much to take chances with.

So play it safe. Get the broad coverage offered by a Hartford Contractors' Equipment Policy. Then you're covered against loss by over-

turn... collision... fire... theft... explosion and other specific hazards.

No time like *now* to look into this. Call your Hartford Fire Insurance Company Group Agent or your insurance broker today. You'll be glad you did.

Year in and year out
you'll do well with the

Hartford
Fire Insurance Company
Group



Hartford Fire Insurance Company
Hartford Accident and Indemnity Company
Hartford Live Stock Insurance Company
Citizens Insurance Company of New Jersey
Hartford 15, Connecticut
New York Underwriters Insurance Company
New York 38, New York
Northwestern Fire and Marine
Insurance Company
Twin City Fire Insurance Company
Minneapolis 2, Minnesota

SALES AND SERVICE...

continued

will assume direction of the company's south central division and the Dallas warehouse. Richard C. Mahony, formerly sales representative in the New England division, has been promoted to New England division manager.

Allis-Chalmers Mfg. Co.: Walter A. Hebler, who has served as export sales manager since 1953, is appointed director of export sales for the tractor group. Hebler, a native of Kansas City, joined Allis-Chalmers in 1933.

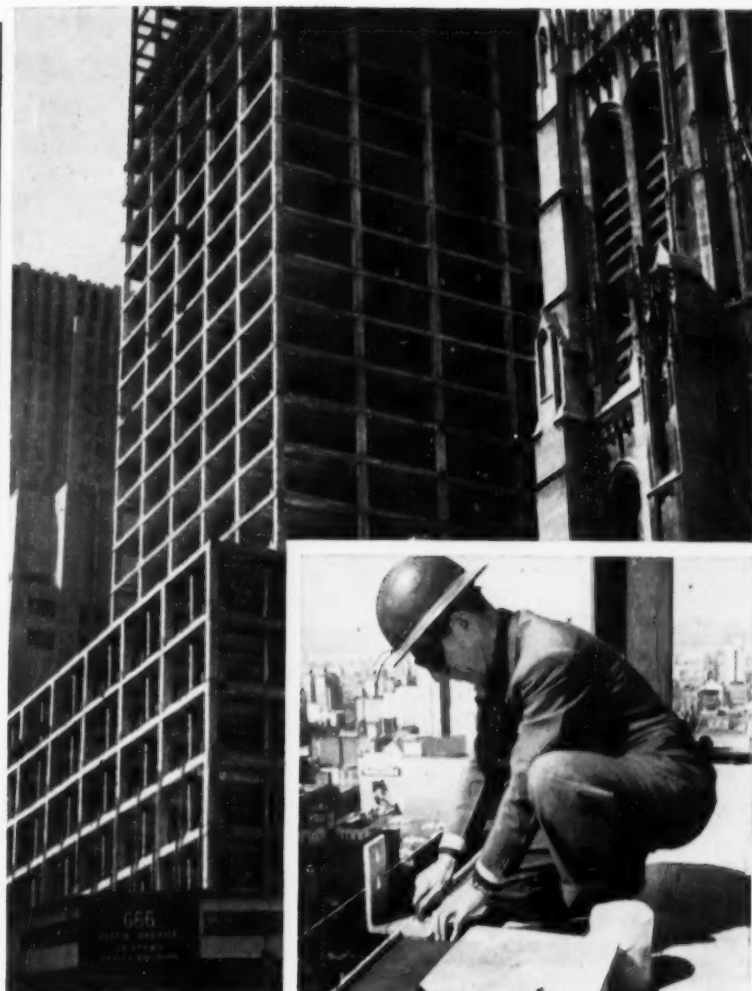
In the Main Office

Lycoming Div., Avco Mfg. Corp.: The appointment of James R. Kerr as president of Lycoming was announced recently by Raymond A. Rich, Avco president. He replaces S. B. Withington, who is retiring as president to take on new duties in a staff capacity for Avco.

Worthington Corp.: The board of directors has announced the election of Walther H. Feldmann as president. He succeeds Edwin J. Schwanhauser, who becomes vice chairman of the board. Hobart C. Ramsey continues as chairman and chief executive officer. Feldmann was formerly president and general manager of Electric Machinery Mfg. Co., which joined Worthington in 1944. He was elected a Worthington vice president in charge of sales in 1950 and executive vice president in 1955. He has been a member of the board since last September.

Frank G. Hough Co.: Frank G. Hough, founder and chairman of the board of the company that bears his name, has announced his retirement. A pioneer in the materials handling and tractor-shovel fields, Hough sold his first hydraulic shovel attachment in 1922 when he was vice president of the Blair Mfg. Co. He acquired Blair in 1933 and formed his own company. In 1939 he introduced his first Payloader, a small machine designed to operate inside box cars. This was the first tractor-shovel designed as a unit. The stock of the Frank G. Hough Co was purchased in 1952 by International Harvester and it is now operated as a subsidiary company. Hough will maintain an office at 158 E. Cook St., Libertyville, Ill.

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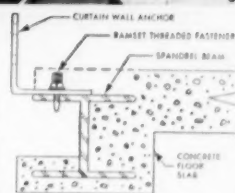
Tishman Building,
666 Fifth Avenue, New York.
Carson and Lundin, Architects;
F. H. Sparks, erector.

Ramset

helps skeleton don skin . . .
in a hurry!

This skeleton was ready for its curtain wall exterior ahead of schedule. The steel flanges to which curtain walls are attached, were fastened to the beams with RAMSET powder-actuated fasteners . . . 15 times faster than old-style methods, because RAMSET eliminates pre-drilling! Says the erector, "RAMSET is the most satisfactory and economical method of setting curtain wall brackets for collateral steel work."

For complete details about RAMSET for your uses, ask for new catalog and AIA file, now ready.



Foreman checks curtain wall anchor bolted to RAMSET stud set in structural steel beam.

Fastening detail shows how RAMSET threaded fastener holds curtain wall anchor firmly in position.



Ramset
Duo-Jobmaster
powder-actuated
fastening tool

Ramset Fastening System

WINCHESTER-WESTERN DIVISION
OLIN MATHIESON CHEMICAL CORPORATION

12103-F BERE A ROAD

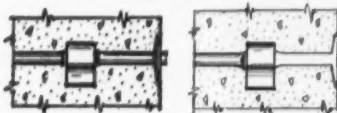
CLEVELAND 11, OHIO

How to Build Better Walls

It's easy . . . use Sure-Grip concrete accessories.

When you use Sure-Grip Snap-In form ties, your walls line up better, don't leak at tie points and are easier to point. They look better too, because there aren't any big, loose cone patches staring you in the eye.

Sure-Grip's patented Snap-In tie which has special flat pieces or clevises fastened to the rod does the job. These clevises keep the tie from turning and breaking the bond with the concrete. Result . . . no leaking, positive snapping and a lot of time saved. Try Sure-Grip Snap-In form ties on your next job and see how much better they are than other ties or twisted wire.

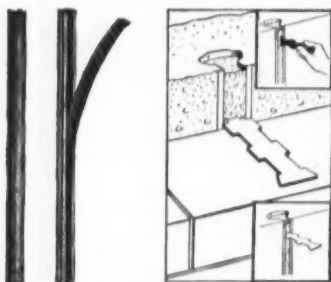


Flat clevises keep tie from turning and breaking bond with concrete. Tie always breaks at proper point.

Special coating on rod between clevises and spreaders prevents bonding to concrete. 1/2 turn snaps off rod.

Sure-Grip Anchors & Anchor Slot

. . . the surest and fastest way to fasten brick, stone, tile or terra cotta to concrete walls, columns and beams. Just nail the anchor slot to the forms. The patented double nailing feature supports the sides of the slot and keeps them from caving in when pouring. You don't have to grind anchors to make them fit. Sure-Grip anchor slot is made from rust resisting material; galvanized steel, Zinaloy, copper, etc., and is available in lengths from 6" to 10' either with or without the slot filler.



We also make a full line of stone, brick and furring anchors for every application.

FREE — Mail the coupon below for our 48 page catalog of concrete accessories and your nearest Sure-Grip dealer's name.

THE DAYTON SURE-GRIP & SHORE CO.

507 Karcher Street Miamisburg, Ohio

Without obligation, send me your free 48 page catalog and the name of my nearest Sure-Grip dealer.

Name _____

Firm _____

Street _____

City _____ State _____

SALES AND SERVICE . . . continued

Special Mention

Stearns Mfg. Co., Inc.: Shawnee Mfg. Co., Inc., makers of light earthmoving attachments, has been sold to Stearns Mfg. Co. and will become a wholly owned subsidiary of that company. Marion Wills, president of Shawnee, emphasized that there will be no change in the management of Shawnee, and that the company will continue to be operated in Topeka by the same personnel and under the same name. Owners of stock in Shawnee, a closed corporation, will receive Stearns stock in the transaction, and both Wills and Seymour S. Smith, Shawnee chairman of the board, are expected to be named directors of the parent company according to the announcement.

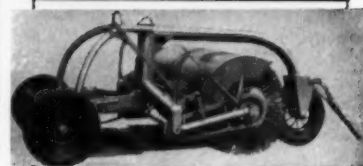
Standard Steel Corp.: Standard has purchased the Leader Iron Works, Decatur, Ill., in a move designed to give the 55-yr.-old company a modern Midwest factory. Road-Master asphalt paving plants will be an important product of the new Midwest factory, according to Robert S. Burns, Standard Steel president. Although no exact sale price was disclosed, company officials said assets totalling \$1,500,000 are being added to Standard Steel through the acquisition.

Universal Form Clamp Co.: A Canadian subsidiary company has been opened at Toronto. J. D. Livingston, who represented Universal in Canada for the past several years, is the manager of the Canadian company.

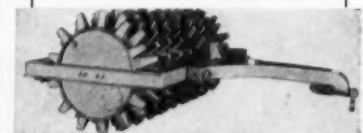
Associations

Asphalt Institute: The University of California's Institute of Transportation and Traffic Engineering will offer its second annual graduate study program in asphalt paving technology. The program is supported by a grant from the Asphalt Institute. The eight-week course, open to qualified college engineering instructors, will begin June 17 at the College of Engineering in Berkeley. Twenty grants-in-aid of \$900 each have been established by the university, which will furnish study and residence facilities. Applications should be made directly to the Institute of Transportation and Traffic Engineering, University of California, Berkeley 4, Cal.

Grace ASPHALT AND COMPACTION EQUIPMENT



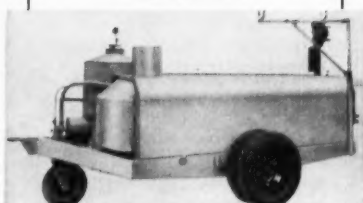
Roadsweepers, traction, engine-driven or tractor-mounted



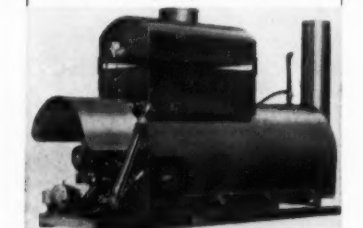
Sheepfoot rollers



Chip spreaders



Circulating asphalt heaters



Automatic oil heaters for hot plants



Pneumatic rollers, self-propelled or trailed

W. E. GRACE MFG. CO.

6100 S. LAMAR STREET
DALLAS 15, TEXAS

John Kenska pockets \$8 more for every load with New Aluminum Trailer



John J. Kenska, of Elyria, Ohio, has four convincing reasons for buying aluminum dump bodies. Comparison of his aluminum dump trailer with his steel units shows a 16 per cent payload increase that yields \$8 more profit per load.

Next, he slashes maintenance costs by \$240 a year because aluminum defies corrosive and abrasive attack by coal, slag, lime, cinders and sand. Trips that take six hours with other trailers can be made in five hours with the aluminum unit; 600 hours

are saved annually on hauling time. Finally, his state license for the lighter aluminum trailer costs him \$59 less than he pays for his steel trailers.

Perfection Steel Body Co., Galion, Ohio, sold John Kenska his aluminum dump body through its Cleveland distributor, Carnegie Body Co. Perfection's use of Alcoa® Aluminum Alloy 5154 cuts empty weight of the 26-foot unit from 13,000 to 9,500 lb. Besides boosting payload, this 3,500-lb reduction cuts fuel costs six per cent traveling empty. Routine wash-

ing, the only care required with corrosion-resistant Alcoa Aluminum, takes but an hour — half the time consumed in cleaning other bodies.

When John Kenska tallied up all these moneysaving advantages, he determined to add three more aluminum dump bodies to his fleet. How about you? Thirteen leading manufacturers are ready to fill your requirements. Get their names by writing today to: Aluminum Company of America, 1879-F Alcoa Building, Pittsburgh 19, Pennsylvania.

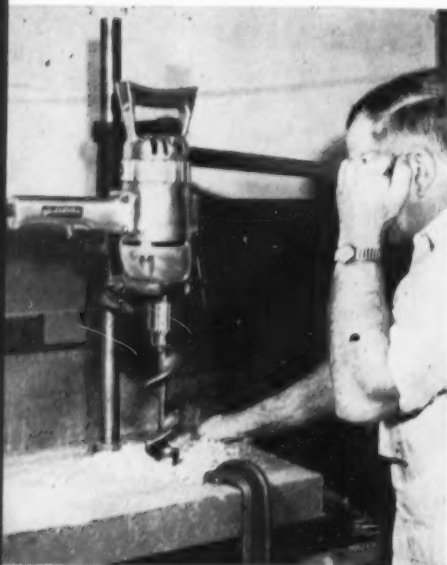


THE ALCOA HOUR
TELEVISION'S FINEST LIVE DRAMA
ALTERNATE SUNDAY EVENINGS



**Your Guide
to the Best in
Aluminum Value**

Construction Equipment News...



It's a Power Source

After adding a 75% power increase to its $\frac{3}{8}$ -in. drill (it delivers 130-ft-lb of torque), Black & Decker consider it a power plant rather than just a drill. Above, it drives a $1\frac{1}{2}$ -in. wood auger. Handles can be removed and the drill can power hoists, speed reducers, etc.—Black & Decker Mfg. Co., Towson, Md.



Case Offers Integrated Tractor

First in a new series of industrial wheel tractors built entirely by J. I. Case Co., the model 320 is shown mounting a $\frac{1}{2}$ -yd loader and a foot-controlled backhoe with 180-deg swing and $12\frac{1}{2}$ -ft digging depth. A single pump provides power for both tools. Built especially for industrial applications, the tractor features

one-piece, drop-forged axles and steel wrap-around sub-frame that protects the engine and transmission and supports mounted equipment. It is powered by a 148-cu-in. engine through a transmission that permits the operator to change from forward to back-up without shifting. —J. I. Case Co., Racine, Wis.

Air Motors Power Hydraulic Drill

All boom and feed tower adjustments on Ingersoll-Rand's new knee-action Crawl-IR drill are hydraulically controlled. Two hydraulic cylinders operate the boom, allowing it to swing in a 85-deg horizontal arc and a 82-deg vertical arc. Three other cylinders position the feed-tower for vertical, horizontal, or angle drilling from any boom position. Holes can be drilled horizontally from ground level up to 7 ft high without moving the unit. Maximum hole spacing is nearly 10 ft. The boom is $5\frac{1}{2}$ ft long and the feed tower is 15 ft high. Two reversible, independently controlled air motors allow steering in any direction.—Ingersoll-Rand Co., 11 Broadway, New York 4, N.Y.





600-hp Engine Powers New Truck

Autocar's AP-40 off-highway rear dumper has a 27-yd rock body, holds 40 tons. It is powered by a 12-cylinder turbocharged Cummins engine that develops 600-hp. The engine gives the truck a 275-to-one hp-to-weight ratio, although the frame alone weighs 16,800 lb. The adaption of the big engine to the AP-40 was made

possible by the development of a new transmission, the Fuller R-1550, which is rugged and flexible enough to utilize the power developed. Top speed is 30 mph. Like other Autocar trucks, the AP-40 features planetary gear drive axles that reduce loads on differentials.—Autocar Div., White Motor Co., Exton, Pa.



Four-Wheel Cheviets

Chevrolet now produces $\frac{1}{2}$, $\frac{3}{4}$, and 1-ton four-wheel-drive trucks. Power is supplied through a four-speed transmission, then split between front and rear wheels through a two-speed transfer case. Front wheels can be engaged without clutching.—Chevrolet Motor Div., General Motors Bldg., Detroit 2, Mich.



Lift Trucks Feature Visibility, Stability

Yale's new G-3 line of pneumatic-tired fork lift trucks—available in 15,000 to 20,000-lb capacities—features exceptional operator visibility, lift speeds of up to 65 fpm, and good stability. The widely spaced lift cylinders, supported by a wide-spread channel assembly, give an unobstructed forward view. Wide-tread tires, 10 in. of clearance under the mast, and a low center of gravity permit travel over rough terrain. The trucks are powered by a 105-hp Chrysler gasoline engine with a fluid coupling transmission or by a Ford V-8 engine with a friction clutch. LPG models are available.—Yale & Towne Co., 11,000 Roosevelt Blvd., Philadelphia 15, Pa.

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but never equalled!

Talbert TRAILERS®



Talbert Model TBDW-90-RG-RA Beam Trailer shown hauling a Model 3900 Manitowoc. Beam Deck can be replaced with a standard platform for hauling other equipment.

Talbert Trailers® in capacities from 50 to 120 tons are unequalled in permitting more economical handling of heavy equipment and supplies. The simplicity of Talbert's Removable Gooseneck,* Gooseneck Rollers and Removable Rear Axle Assembly reduces loading time to a minimum, speeds unloading and provides interchange of various deck types to increase operation flexibility—advantages pioneered and originated by Talbert. Yet, the Talbert Trailer® features of custom design at production prices costs you no more. Send the coupon

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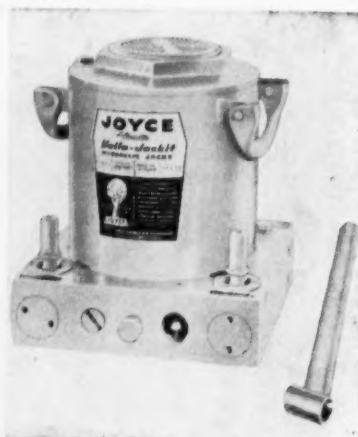
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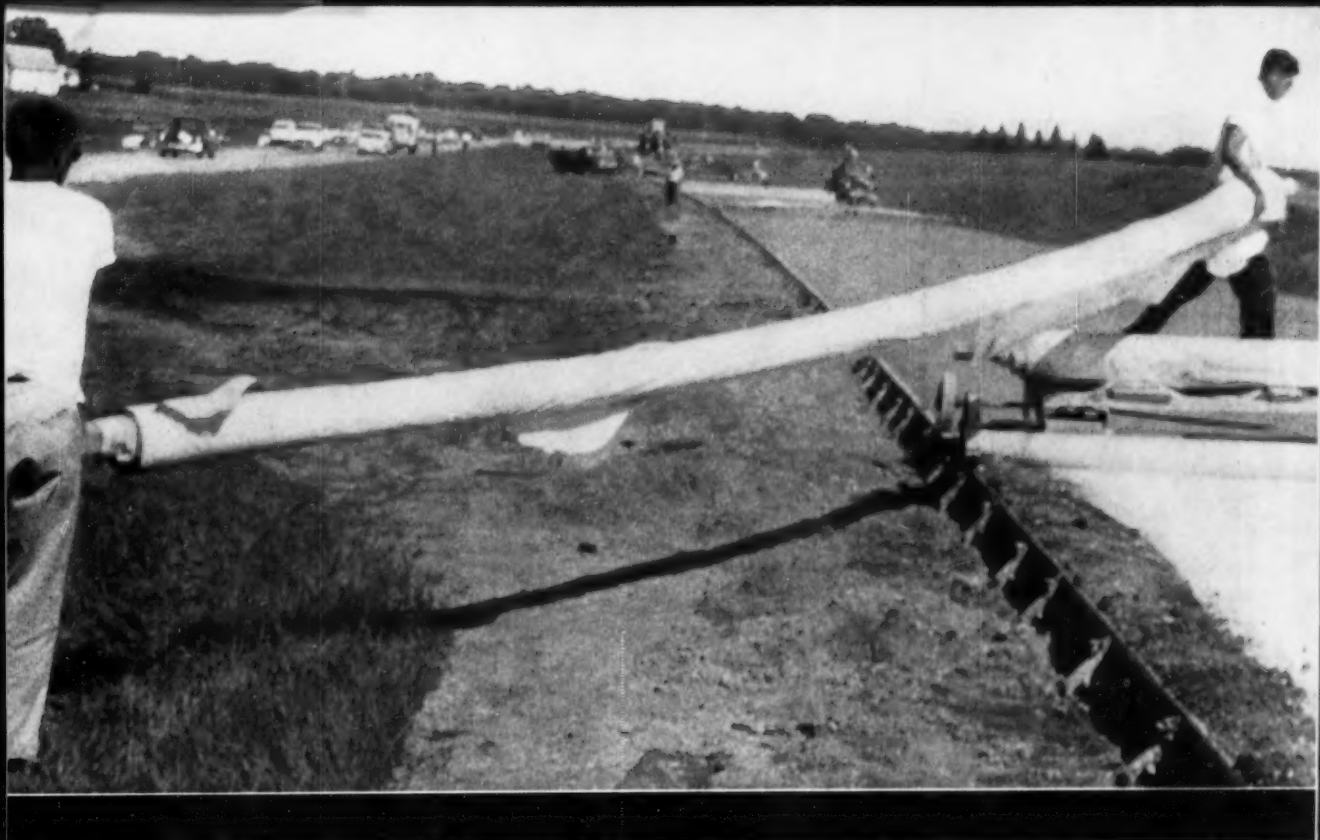
Custom Design at Production Prices

EQUIPMENT NEWS... continued



NEW JACK LINE—A new line of hand operated hydraulic jacks, with capacities ranging from 3 to 100 tons, has been developed by the Joyce-Cridland Co. Called the Joyce Liftmaster Yello-Jacks, the jacks cover a capacity range of from 3 to 100 tons. An outstanding feature of the jacks is a malleable iron top cap that allows off-center loading when necessary. Other features include: an inexpensive pump assembly that can be replaced in the field; serrated contact pads on models above 30 tons, and contact pads with non-slip circular grooves for smaller models; the location of all valves under one cap screw for easy maintenance without dismantling the jack; and, because the jack functions in horizontal position, full power for pushing operations.—**Jack Div., Joyce-Cridland Co., 2027 E. First St., Dayton, Ohio.**

AIR-OPERATED PTO—Designed for use with engines of up to 600 hp, Twin Disc's new air-operated, remote-controlled friction power take-off combines a Twin Disc model PO air clutch with a standard friction power take-off. The air clutch replaces a mechanically-actuated clutch. Engagement and disengagement is accomplished by the turn of an air valve, rather than by a manually-operated handle. A rotary seal has been added to the end of the output shaft to permit actuating air to enter the clutch through a drilled passage in the shaft. Air pressure of 90 to 100 psi will produce all the torque normally needed, according to the manufacturer, but 130 psi can be utilized if necessary. The unit, which is interchangeable with Twin Disc 18-in., single and double plate mechanically-engaged



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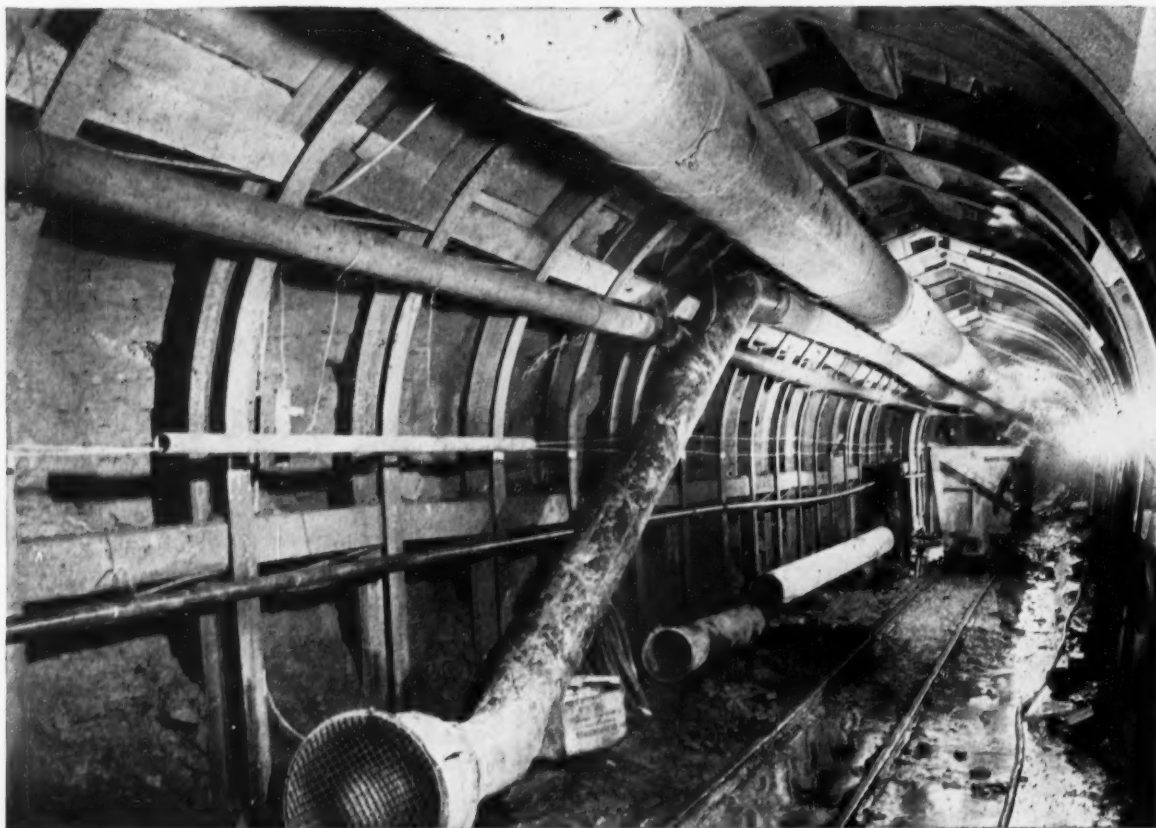
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No matter how deep you go underground, you can take fresh air with you and get rid of stale air, gases and fumes through dependable Naylor Spiralweld pipe.

Over the years, contractors have come to recognize the advantages of Naylor over other lightweight pipe. In large diameter vent pipe, for example, the exclusive Naylor spiral lock permits the use of lighter gauge material without sacrifice of strength or safety—particularly in push-pull operations.

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Whether you need pipe for ventilating, air and water, hydraulicking, dredging or materials handling, it will pay you to look into this Naylor pipe and coupling combination.

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power take-off, is furnished with SAE 0 or 00 flywheel housings. Air-operated conversion kits are available for some Twin Disc standard power take-offs now in the field.—Twin Disc Clutch Co., Racine, Wis.



NEW COMPRESSOR—A compact and rugged diesel-driven air compressor has been developed by Cerlist Diesel, Inc. Called the JW-78, the compressor has a rated delivery of 78 cfm at 100 psi. The unit is powered by a four-cycle, one-cylinder diesel that develops 20 hp at 1500 rpm. Fuel consumption is rated at ½ to 1-gph. The engine and the compressor cylinder liners are contained in a common crankcase. The crankshaft transmits power from the engine piston with its air-craft-type connecting rod to the compressor piston, which is fitted with a link rod. The lubricating system, common to the engine and the compressor, provides both pressurized oil feed and splash lubrication. The compressor is available as a portable model with disc wheels and pneumatic tires and fenders, or as skid-mounted stationary plant. As a portable, the unit weighs 1810 lb.—JW Div., Cerlist Diesel, Inc., Burlington, N. C.

BACKHOE FOR IH TRACTOR—

The Henry hydraulic backhoe model Super C-10H has been approved for use with the International Harvester 130 utility tractor. The Henry is said by the manufacturer to be well suited for this small tractor because of its ground-gripping features. The main backhoe frame sits right on the earth, putting the entire digging weight on the ground rather than on the tractor itself. Available with either hydraulic or manual

Safety-Engineered for superior service...



U-W GOLD CLIPS

- Designed for rugged duty
- Wide range of sizes from ⅛" to 1¼"
- Convenient packaging speeds handling

THE Gold Clip, an important addition to Upson-Walton's complete line of highest quality wire rope fittings, is setting a new standard for rugged, dependable service. U-bolt gold-chromate coated after galvanizing, your identification of top quality. All *Gold-Clips* are drop-forged from high grade forging steel.

Available from stock in ⅛" through 1¼" sizes. Convenient packaging simplifies handling. See your nearby Upson-Walton distributor or write for complete details. The Upson-Walton Co., 12495 Elmwood Avenue, Cleveland 11, Ohio.

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WATER LOWERED 11 FT AT RATE OF ONE FT PER HOUR

ANYONE WHO HAS tackled a wet job in extremely coarse sand and gravel knows what torrents of water drain through such pervious soil. Yet 11 hours was all it took for the Griffin Wellpoint system shown in photo to give a bone-dry subgrade. Excavation of the 20,000 sq ft area then proceeded rapidly by tractor-scraper.

Upon the recommendation of Alman, Fordice & Handy, architects, the wellpoint system was maintained in operation until danger of flotation was eliminated by construction.

• Footnote: drainage of surrounding area caused 4 ft drop in static level of a well 400 ft away. Got a "big dry"? Specify Griffin.

GRIFFIN

WELLPOINT CORP.

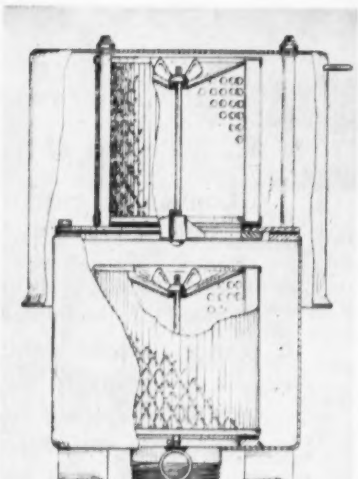
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EQUIPMENT NEWS . . . continued

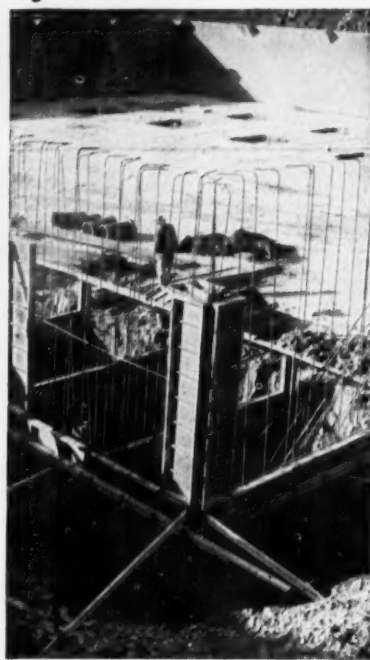


outriggers, the Henry makes 9 ft of ground contact. The main frame is raised and lowered hydraulically. The boom can swing in a continuous 160-deg arc without the necessity of resetting pins. It will dig from any angle within that arc, and it can easily swing a load from the digging areas. Sixteen bucket sizes are available, ranging in width from 12 to 38 in. The boom model pictured will dig 10 ft deep and load at 8½ ft.—*Henry Mfg. Co., Inc., 1700 N. Clay St., Topeka, Kan.*



HEAVY-DUTY FILTER—A new air filter that makes use of a pair of heavy duty elements in series—each containing 4800 sq in. of filtering area—has been designed by Purolator. The new filter, especially designed for off-road equipment, crushers, and pneumatic drill equipment, needs only a daily air-washing to keep it clean. Available in 100, 200, 400, 600, and 900-cfm capacities, the filter allows equipment to remain in operation

Symons FIELD REPORT...



Contractor Saves 40% with Symons Forms . . .

7,500 square feet of Symons Standard Forms were used in the new 2 million gallon capacity pumping station at Melrose Park, Illinois. 2,000 cubic yards of concrete were used on the job and the concrete contractor, Louis Macro Company, Melrose Park, reported a 40 per cent saving through the use of Symons Forms. Walls for the job were completed in three pours.

Symons engineering service can help you realize substantial savings in forming. With your plans, our engineers will prepare a complete form layout, bill of materials, and make recommendations for the most efficient and cost saving method of forming.

Our field service representatives are sales engineers, ready and able to advise you on form erection, pouring and stripping methods that will help you save time, labor and materials. You can call on them to assist you on any forming problems.

Symons Forms can be rented with purchase option. **Symons Clamp & Mfg. Co., 4255 Diversey Avenue, Dept. F-7, Chicago 39, Illinois.**

*Sam Cerniglia Company, Melrose Park, Illinois
General Contractor.*



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In actual road tests . . .



Dodge won top honors in test after test between comparable models of all three low-priced trucks. Special high-speed camera records actual finish of hill-climb test. From a standing start, test crews raced all three trucks up a 32% grade. Dodge was first by five lengths.

and on your job . . .



Dodge gives you more V-8 power, in every weight class, than either of the other two low-priced trucks. From 204-hp. pick-ups to 232-hp. tandems, the extra power you get in a Dodge means an on-the-job performance bonus for you. It means greater economy, too, because it cuts down engine strain, reduces wear and repairs.

Dodge Power Giants outpower, outperform the "other two" low-priced trucks by wide margin!

Want power? Dodge outpowers its low-priced competitors by as much as 27 percent.

Want economical performance? The advanced design of the Dodge short-stroke V-8 produces the most efficient fuel usage in the industry. You get more miles per gallon . . . full power on *regular gas*.

Want extra payload capacity and handling ease? Dodge has 'em beat on both counts.

How about it? Don't you think you should find out for yourself? Just give your Dodge dealer a ring. He'll bring a truck right to your door and he'll show you certified test results that demonstrate Dodge is a winner in actual tests and on your job.

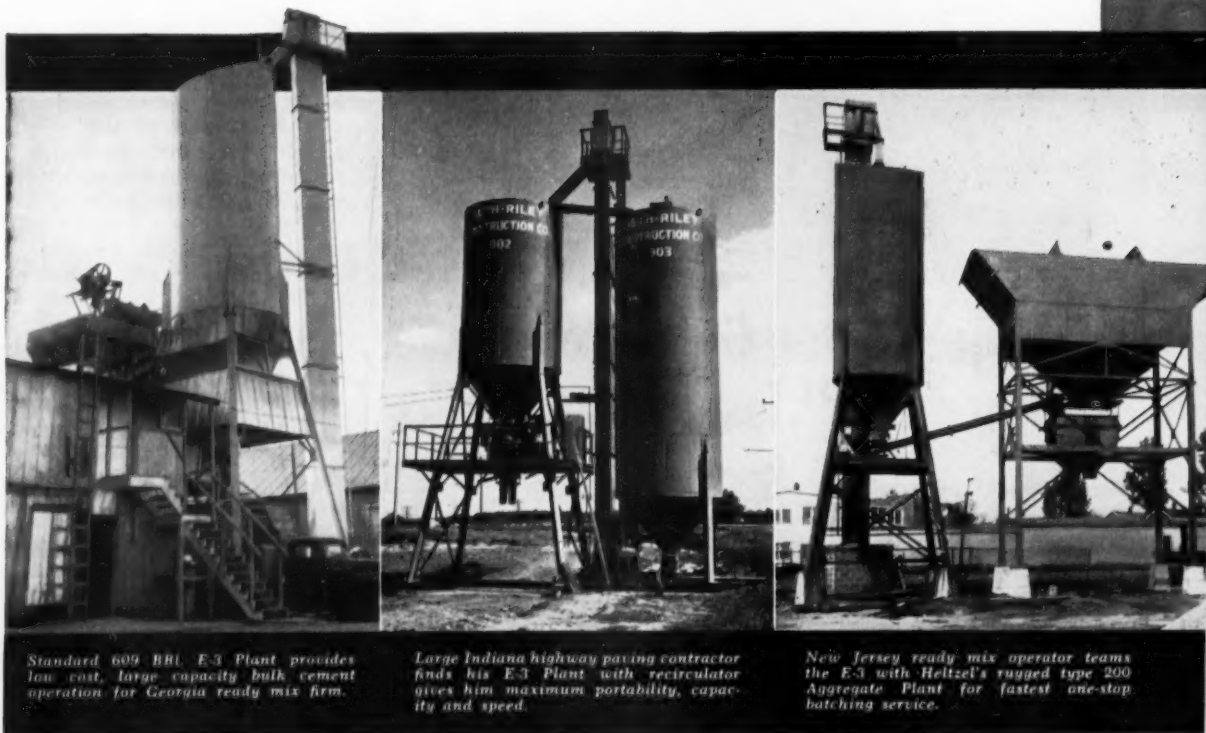
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PowerGiants

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Here's the Nation's Outstanding Bulk Cement Batching Plant Offer

Long known to be the best engineered plant, increased demand for the Heltzel E-3, has resulted in production economies you'll want to know more about



Standard 609 BBL E-3 Plant provides low cost, large capacity bulk cement operation for Georgia ready mix firm.

Large Indiana highway paving contractor finds his E-3 Plant with recirculator gives him maximum portability, capacity and speed.

New Jersey ready mix operator teams the E-3 with Heltzel's rugged type 200 Aggregate Plant for fastest one-stop batching service.

133

Illinois paving contractor uses the Heltzel E-3 with extra large ground cement storage to provide high speed batching for modern paving operation. Note piers for addition of third 1000 BBl. recirculator.



Ohio paving contractor selected this E-3 with recirculator after comparing with several other makes. He reports the plant is most versatile, fast and exceedingly accurate.

● The Heltzel E-3 Bulk Cement Plant has long been recognized as the industry's finest engineered plant. Now, because of an increased demand, Heltzel has set up a new production facility that has resulted in economies that enable us to offer this outstanding plant at standard equipment prices.

There is absolutely no quality reduction! You get the all butt-welded bin with rounded corners (fabricated by an automatic welding process) that assures smooth flow and guarantees water tightness. You have your choice of Heltzel's patented tubular valves—with or without rotary vane feed. The rugged wide flange, flare-leg supports that mean extra rigidity and truck room! All connections are out in the open, easily accessible for fast, easy erection or dismantling.

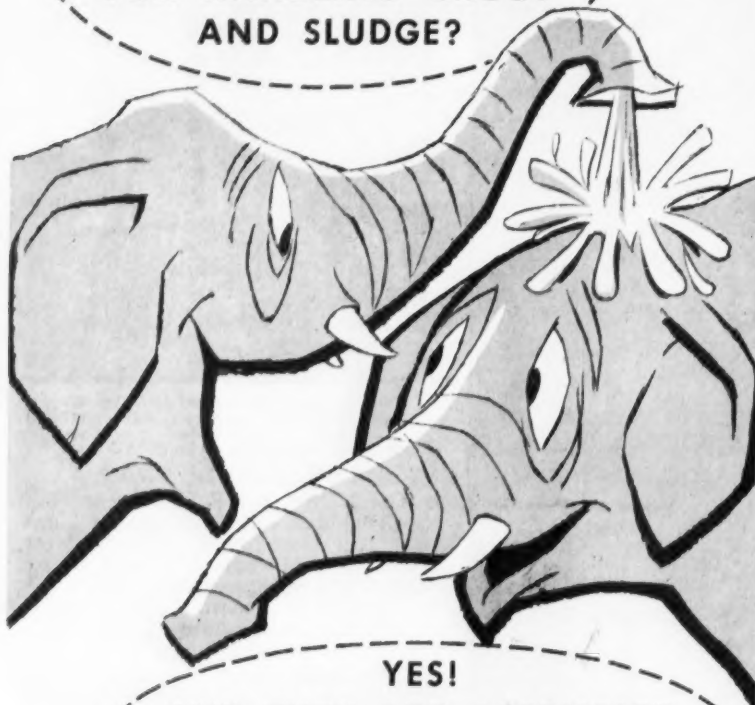
Select your capacity—from 250 BBls to 670 BBls—portable recirculators up to 1000 BBls each. Choose your batcher—manual, semi- or fully automatic from 16 to 60 cubic feet including the outstanding Heltzel Twin Batcher designed for high production paving operations. Plants available with "unitized construction"—factory assembled in units for even faster erection and dismantling.

Whatever your needs you will want to get all the facts on this exceptional offer before you buy. Contact your Heltzel representative—or write direct.



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DID YOU KNOW
THAT **WAGENER**
MAKES THE FINEST PUMPS
FOR HANDLING GROUT
AND SLUDGE?



YES!
AND THEY ARE ASSEMBLED
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Even though Wagener grout and sludge pumps are tailor-made for power source, capacity, pressure, viscosity and resistance to abrasives . . . they can be shipped promptly . . . because they are assembled from standard components. In addition, they are available in price ranges suitable to anticipated usage.

Trouble-free pumping is assured by the sturdy construction of Wagener pumps. Self-sealing pumpcup packing

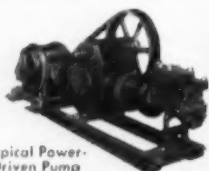
and divided piston rods reduce maintenance costs to the minimum.

Wagener pumps will pump anything that can be pumped . . . efficiently . . . economically . . . dependably. They offer almost unlimited flexibility in meeting power source and performance requirements. They are used by leading contractors all over the world.

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EQUIPMENT NEWS . . .

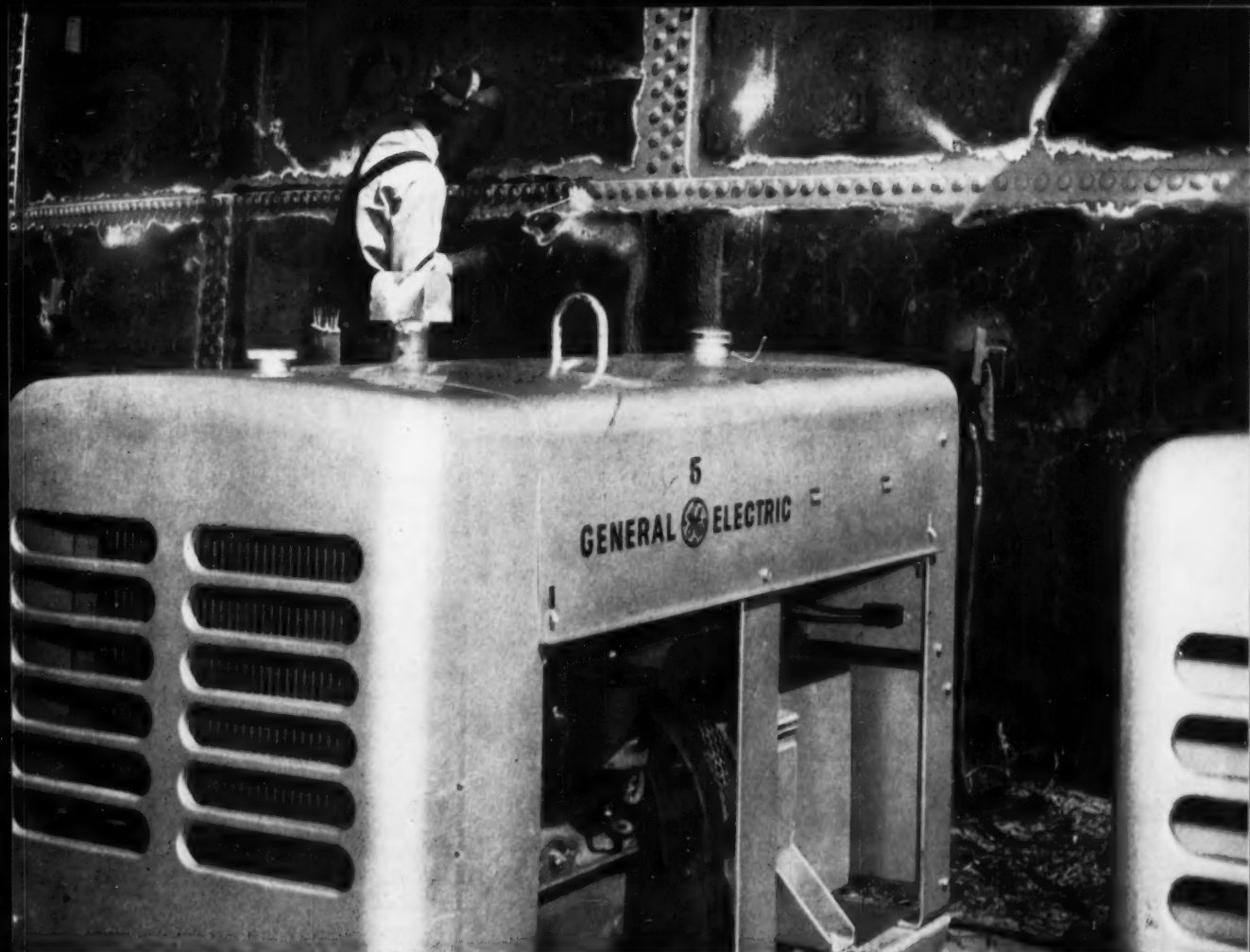
continued from page 248

during servicing of the first stage element, according to the company. Housings are constructed of heavy gage steel and the elements, which weigh 9 lb each, are made of a resin-impregnated cellulose with a 3/32-in. steel base and cover. The units are approximately 30 in. high and 19 1/4 in. in dia (for the 600-cfm model). Each element is 10 in. long and 10 1/4 in dia. The entire unit weighs about 70 lb.—**Purolator Products, Inc., Rahway, N. J.**



OFF-HIGHWAY HAULER — A new heavy-duty International six-wheel truck, designed especially for off-highway operation, has a gross vehicle weight rating of 60,000 lb. The truck can mount eight or nine-yd concrete mixer bodies, or rugged earth-moving bodies. Called the VF-230, the truck is powered by a new International truck-type engine rated at 257 hp maximum. Standard equipment includes a 15,000-lb front axle, hydraulic powered steering, air brakes, 12-v electrical system, 15-in. clutch, and 60-gal right-side step fuel tank. For maximum front axle loading, a 98-in. Space Saver cab is available as optional equipment. A wide range of axle ratios and transmissions is available to meet specific demands. Standard wheelbase is 175 in.—**International Harvester Co., 180 N. Michigan Ave., Chicago 1, Ill.**

SOLID SUPPORT—A new universal tripod for levels and transits offered by the David White Instrument Co. combines solid support for instruments with a wide frame of European-type construction. The design is said to give the tripod good stability that



On round-the-clock repair job, General Electric engine-driven welders raise production 11%

S. R. Smith and Associates of Tulsa, Oklahoma recently tackled the job of repairing eleven leaky 55,000-gallon oil storage tanks. This required putting a weld around each rivet and along each seam. On this job they were forced to run six General Electric engine-driven welders on a three-shift, 24-hour day—often in temperatures of over 100°.

The results . . . an 11% increase in production, or a gain of one hour per day, per welding operator.

This gain was attributed by L. A. "Lon" Duvall, partner in the firm, to a reduction in downtime over their previous engine-driven welders.

Mr. Duvall said, "economy of these machines is another feature I like. Recently, we ran one wide open for eleven straight hours using your G-E $\frac{1}{4}$ " W-612A rods,

and the machine used only 16½ gallons of gasoline."

Whether your welding application is repair, construction, or job shop operation, you will find General Electric's line of 200-, 300-, and 400-ampere engine-driven welders operate with a minimum of maintenance or repair, while producing uniformly excellent welds.

What's more, General Electric gives you fast delivery and more dependable service on a complete line of high-quality a-c and d-c equipment, accessories, and electrodes for all your welding needs.

For more information, contact your nearest General Electric welding outlet, listed in the yellow pages of your telephone book. Or write for bulletin GED-3057 to Section 714-7, General Electric Co., Schenectady, New York.

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Write today for Bulletin 60-B. Gives complete specifications and working ranges for the fully-convertible 1 yard Model 60 with 21 ton crane rating.

BAY CITY SHOVELS, INC. • BAY CITY, MICHIGAN

BAY CITY

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Page 254 — CONSTRUCTION METHODS and Equipment — June 1957

how you can profit in heavy digging with **BAY CITY** reserve power

Just look at the 1 yard rock dipper in this striking action photo—filled to brimming capacity. The 21-foot, heavily reinforced box-type welded boom wields this mighty load with ease and speed. The one-piece continuous chain crowd has automatic tension adjuster and a power dipper trip gives effortless dumping. Reverse crowd mechanism, too, is power controlled.

In any heavy digging, you need power and lots of it. You'll have reserve power to spare with the BAY CITY Model 60, thanks to its husky, 113.5 hp GM diesel engine. And, for maneuverability, you can't beat a BAY CITY. It provides a well-balanced assembly with all machinery and engine mounted on a one-piece, heat-treated cast rotating base. Powerful shoe-type swing clutches combined with balanced hoist and crowd speeds provide smooth operation and a fast digging cycle.

Your heavy digging and material handling will increase profitably; your maintenance and downtime drop off sharply, when you use dependable, powerful BAY CITY equipment.



270



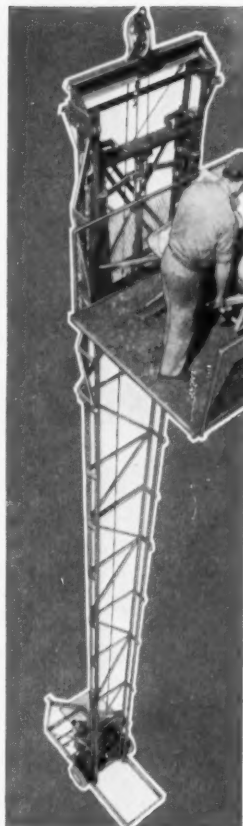


is not affected by vibration or wind. The head is $3\frac{1}{2}$ in. in dia with eight anodized threads to the inch. Each leg uses triangular truss construction with solid metal support braces that put pressure against the wood legs for additional support. Each spoke of the wooden legs is alternately painted red and white for safety and as an aid in locating the instrument.

—David White Instrument Co., 2051 N. 19th St., Milwaukee 1, Wis.



CHECKS POISON IVY — Men working outdoors can get quick relief from poison plant irritations with individual poison ivy ointment packets introduced by Medical Supply Co., Rockford, Ill. The ointment is packed in individual foil envelopes for quick, on-the-spot treatment. To apply the ointment directly to the affected area, the worker simply squeezes the foil envelope after tearing off one



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... gets you there **FASTEST**
with the **MOSTEST**



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Fastest — in 23 minutes you're up in the air with your first load. 23 minutes from trailing to elevating.

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Lowest cost per ton lifted. No additional personnel required . . . one man does it all . . . easily.

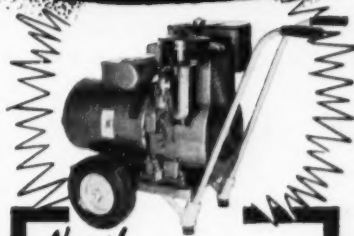
There's nothing like the Buck . . . it's a portable, self-erecting, self-contained hoisting machine.

For a free demonstration and more information contact any of the 73 Buck Dealers or write direct:

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DESIGNS—ALL WORKED OUT!**

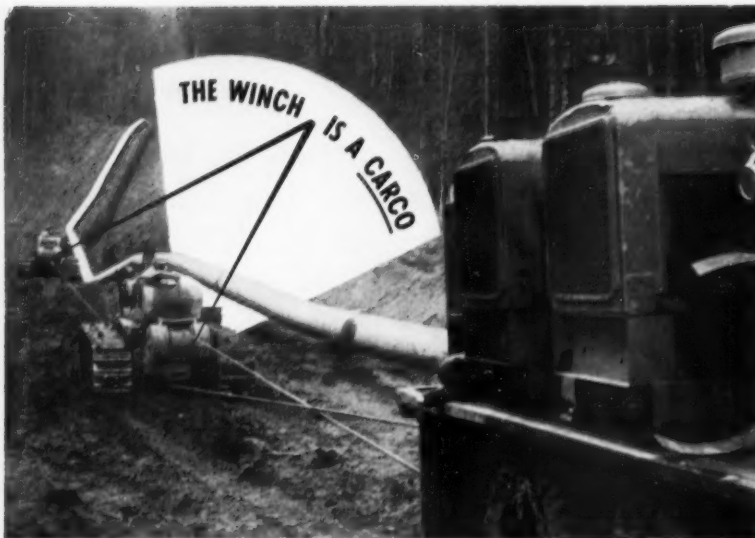
No more algebraic formulas or calculations to make. Simply locate the table covering the member you are designing, apply span and load requirements, and then read off directly concrete dimension and reinforcing steel data. Follows the latest codes and practices. Send check or money order for your copy, today.

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CARCO WINCHES' PROVEN DEPENDABILITY HELPS KEEP PIPELINE JOB ON SCHEDULE

The use and performance of Carco winches on numerous heavy construction and pipeline projects similar to your own jobs are the most reliable measure of both their value to you and their dependability.

Today, most contractors in tackling heavy construction and pipeline jobs find it pays to include one or more Carco winches as part of their equipment . . . and this includes the nation's largest and most efficient operators.

The River Construction Corporation of Fort Worth, Texas, for instance, used six Carco Model G winches on International TD-18's and one Carco Model J winch on a TD-24 in completing schedules 18 and 19 of the Pacific Northwest pipeline.

Working on grades up to 55 per cent, Carco winches towed up, held and lowered the heavy sideboom tractors that kept the pipe in position for welding, towed and lowered the welders and performed a multitude of other services that kept the job moving and helped keep costs within estimated figures.

Put Carco winches to work on your jobs. Based upon their rugged towing and hoisting power and their quality construction, they are relatively inexpensive . . . and they will cut your machinery investment by eliminating, in many instances, the need for larger, bulkier and more costly equipment.

See your nearest Carco dealer. You will find him an equipment specialist, able to help you select the model you need. PACIFIC CAR AND FOUNDRY COMPANY, Renton, Wash. Branch at Chicago, Ill.



Carcometal case, smooth and streamlined, seals out dirt, dust and water to protect gears which operate in a continuous oil bath.



An automatic brake, available at added cost, prevents load drop or slip-back by taking effect the instant tractor clutch is disengaged.

Carco winches have earned the confidence of contractors everywhere. As a result, Carco makes more winches for more makes and models of industrial tractors than other producers.

CARCO

EQUIPMENT NEWS . . . continued

corner. It will check the infection before the toxic agent has a chance to spread and this helps to localize the irritation. The ointment is said to be effective both as a preventative and a cure. Six 3.1-gram foils come in compact unit packages.—Medical Supply Co., Rockford, Ill.

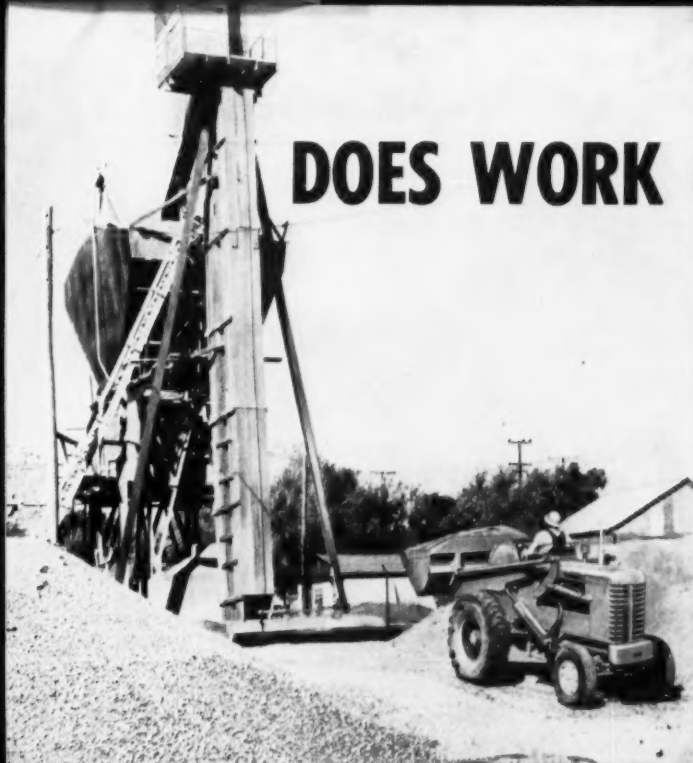


EASY TO HANDLE — Vibro-Plus's new AP pneumatic vibrators feature a built-in, pneumatically driven vibrating element that eliminates the need for a separate air motor, transmission or bearings. The vibrator has only two moving parts. The AP line offers three head sizes ranging from 2 3/8 to 3-in. in dia. Lubrication is automatic through an oil lubricator with a 1/2-in. shut-off valve. The lubricator is filled only every 8 hr. The double-wall rubber hose connected to the vibrator tube is designed not only to maneuver the vibrator, but to serve as an intake and exhaust line for air.—Vibro-Plus Products, Inc., Stanhope, N.J.

HANDLES VISCOUS LIQUIDS—

A new type pumping unit that will dispense—direct from original 55-gal drums—caulking compounds, putties, adhesives, and other materials that normally are too stiff to be poured from their containers, has been developed by Gray Co. Besides eliminating slow hand application or transfer, the new Graco Inductors completely seal material in the container to protect against contamination, spillage, aeration, or waste. The new dispensers use an air powered pump to literally suck up the liquid. Graco pumps for use with the Inductors are available in power ratios to meet all volume and pressure requirements. The units are also available in half drum and 5-gal. sizes.—Gray Co., Inc., 1089 Sibley St., N.E., Minneapolis 13, Minn.

continued on page 258



DOES WORK USUALLY HANDLED BY CLAMSHELL

*...plus
many other jobs*

versatile

TRACTOMOTIVE TL-11 TRACTO-LOADER® keeps down operating cost for ready-mix plant

No big, expensive, single-purpose machines for Ready-Mix Concrete, Muskogee, Oklahoma. Its low-cost TRACTO-LOADER keeps the bins well-supplied with sand and gravel . . . and fills in "waiting periods" by doing other jobs — transports concrete pipe, reinforcing wire and rods, concrete block . . . loads cinders . . . does general yard cleanup work.

Equipment that keeps producing all day, every day, keeps your income up, your costs down. Ask your Allis-Chalmers construction machinery dealer to show you the multi-purpose TRACTO-LOADERS. Choice of five models; gasoline and diesel.

FLOOR WORKING AREA IS KEPT LEVEL with the TL-11 because operator has hydraulic control of bucket — no digging below grade. Loads are heaped, too, because there is a scooping action with TIP-BACK BUCKET and smooth, positive crowding with HYDRAULIC TORQUE CONVERTER DRIVE.

BUCKET CAPACITY: 1 1/2 cu yd
BRAKE HP: 63 (gasoline)
77 (diesel)

SPEEDS: 4 forward; up to 20 mph
4 reverse up to 25 mph
WEIGHT: 11,300 lb (gasoline)
11,500 lb (diesel)

TRACTO — a sure sign of modern design

SOLD AND SERVICED BY YOUR ALLIS-CHALMERS CONSTRUCTION MACHINERY DEALER

HOW IT'S DONE At left is over-all view of bucket elevator with a two-compartment overhead bin — one for sand, one for gravel. At the base of elevator is a ground level hopper which is kept filled by the TL-11 TRACTO-LOADER (below).

Operator said he likes the stability of the TL-11—carries heaping loads without rocking. In the TL-11, you get the long wheel base and strong construction of the 4-wheel drive TL-12 TRACTO-LOADER . . . plus the short turning radius of the 2-wheel drive TL-10.



Send For Free Descriptive Catalog
On The Complete Line Of Tracto-Loaders

TRACTOMOTIVE

TRACTOMOTIVE CORPORATION, DEERFIELD, ILLINOIS

TRACTOMOTIVE CORPORATION, Dept. CM
Deerfield, Illinois

- ☐ Please send TRACTO-LOADER Catalog
☐ Have salesman call

Name
Title
Company
Address
City State





Preferred by most contractors for Guniting, Schramm Model 315 and 600 Compressors with Pneumastat produce compressed air to the exact requirements of tools being used. They operate at any desired pressure for long periods without maintenance.

CONTRACTORS SAY, "BEST FOR GUNITING—

Controls air delivery to exact requirements"

Fluctuating air pressure just *can't* wreck Guniting jobs when Schramm Compressors supply the air. Reason: Pneumastat! Installed on every Schramm Compressor, this patented Schramm control automatically gives you constant, uniform pressure—no variations. It also regulates air delivery to suit job requirements.

Pneumastat is the industry's simplest, most perfect instrument for controlling compressor speed according to the demand for air. Many other devices vary the speed in only two or three steps. Pneumastat does the job in an infinite number of steps. This is one of the reasons why most contractors prefer Schramm Compressors for Guniting.

Other reasons are long life and low cost. Schramm mechanically operated poppet-type intake valves last as long as the compressor. Multiple cylinder construction means less work for each discharge valve. Schramm engines operate at the speed for which they are designed, instead of being overspeeded to 1800 or 2100 rpm. Result: economical operation over long periods without maintenance.

Full details of Schramm Model 315 and 600 Compressors—most often used in Guniting—are yours for the asking. Write for Catalog 5501. Or see your local Schramm dealer for a demonstration; he's listed in the Yellow Pages of your Telephone Directory.

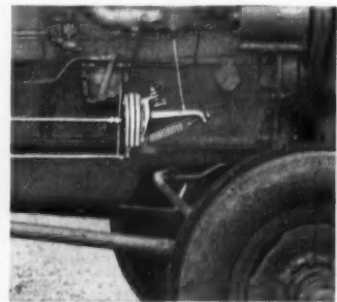
Schramm, Inc.

MANUFACTURERS OF AIR COMPRESSORS

604 North Garfield Ave. • West Chester, Pa.



Schramm Portable Compressors—both gas engine and diesel driven—are complete air compression plants. The Model 600 shown here delivers up to 600 cfm at pressures up to 100 psi.



Smooth, uninterrupted air flow—the Schramm Pneumastat, exclusive, patented air-delivery regulator, automatically controls the speed of engine and compressor in accordance with air requirements. Saves up to 50% in fuel costs.

EQUIPMENT NEWS... continued



FOUR-IN-ONE—Gen-A-Matic's Modular Trailerized Generators, which combine four separate generating units that can be used in combination or separately, offer a versatile power package for use on jobs requiring from 5 to 20 kw. The MGT units enable all or part of the potential power output to be used. If only partial power is required, a single generator can be used and the result is an important fuel savings. Power failure of a single unit does not affect the operation of the other three generators. The units are mounted on a trailer that can be pulled easily by car or a pickup truck. They are available in 120 v, single phase, ac.—**Gen-A-Matic Corp., 14741 Bessemer St., Van Nuys, Cal.**

INTEGRAL OILER—LeRoi's new triple tamper, which features a built-in line oiler to assure positive oil feed while the tamper is in operation, also has a handle-grip throttle valve with a safety snap action that shuts off the air supply when the lever is released. A plug type throttle is available as optional equipment. The tamper's line oiler is of non-splurging design and it incorporates an adjustable oil regulator and plates that prevent excessive oil foaming. Its 1¼-qt capacity allows a full 8-hr day of operation with one filling. The 114-lb tamper is designed for narrow trench, close foundation, or abutment tamping. Its three butts cover a 70 sq in. area. The tamper lifts and carries its own weight, so that the operator merely guides it in operation. Other safety features include extra long handles and air hose connections where they won't interfere with the operator. The tamper butts are mounted on the piston stems by a locking taper of bolted construction. All major working parts are steel drop forged, according to the company.—**LeRoi Div., Westinghouse Air Brake Co., Milwaukee 1, Wis.**

continued on page 261

Armco SMOOTH-FLO Sewer Pipe being lowered into a trench for new South Bend, Indiana, combined sewer. Special trench shield was designed by the contractor. Exterior of pipe has a protective whitewash coating.

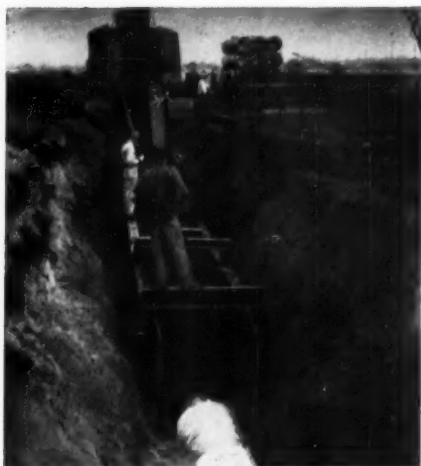
Clyde E. Williams & Associates
Consulting Engineers

Raymond Andrysiak
City Engineer

Niles Excavating Company
Contractors



Contractor Installs Armco SMOOTH-FLO Sewer Pipe 50% Faster Than Estimated



Back hoe pulling shield into position for another length of SMOOTH-FLO Pipe. In background is truck with nine lengths of pipe.

The Niles Excavating Company, contractors of South Bend, Indiana, recently installed Armco SMOOTH-FLO Pipe as a combined sewer for South Bend. This contractor found he could install the SMOOTH-FLO Pipe 50% faster than anticipated!

Considering equipment and manpower, the contractor estimated he could complete 225 feet of the sewer a day. But he had no trouble in laying and finishing as much as 340 feet a day.

A special trench shield designed by the contractor helped speed the job. A back hoe excavated ahead of the shield about two inches below grade. Then it pulled the shield along the trench. A flat metal plate on the shield leveled the earth in the trench bottom, providing a soft cushion and uniform grade.

Armco SMOOTH-FLO Pipe was placed through the shield by means of the lifting lugs. After attaching coupling bands, the pipe was backfilled immediately. And the shield moved on.

Speed of installation is an important advantage you get in *all* of the more than 30 Armco Products for drainage and construction. They are used in a wide variety of applications for highways, railways, industries and municipalities. Write us for complete data, Armco Drainage & Metal Products, Inc., 4667 Curtis Street, Middletown, Ohio, Subsidiary of Armco Steel Corporation. In Canada: write Guelph, Ontario. Export: The Armco International Corporation.

ARMCO CONSTRUCTION PRODUCTS



Blaw-Knox Forms simplify construction of James River Bridge



New forming method eliminates guying and shoring • speeds setting and stripping

● A basically new idea in steel column forming for the "T"-shaped substructure of the James River Bridge at Richmond, Va. on the Richmond-Petersburg Turnpike has simplified work for contractors. These specially engineered forms by Blaw-Knox allows the 44-ft. "T"-heads of the substructure to be poured as an integral part of the column without shoring or guying.

Each of the 100 columns on this 6-lane, divided-roadway bridge was poured in 16-ft. and higher lifts. When the reinforced concrete had set all the forms were removed except a 2-ft. lap ring which supported the forms for the next lift.

When the "T"-hammerhead is poured a unit of special pier forms supports the bottom and side forms.

After the concrete sets, the side forms are removed ahead of the bottom forms and used on the next column. Due to the varying column heights an adjustable, circular, telescoping form was set on the foundation for the initial pour.

If you are bidding on any of the many bridges or structures in the new highway program or have any difficult concrete forming jobs ahead of you be sure to make use of the Blaw-Knox Steel Forms Consultation Service.



BLAW-KNOX COMPANY

Steel Forms Department • Blaw-Knox Equipment Division

P. O. Box 1198 • Pittsburgh 22, Pa. • Phone: Sterling 1-2700

FREE



Form Erection Drawings for owners of EFCO FORMS

In addition to free form erection drawings, here are other benefits enjoyed by owners of EFCO Steel Forms for concrete construction:

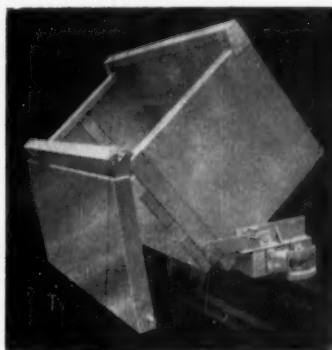
- Lifetime steel faces should never need to be replaced.
- Easy to handle and assemble.
- Saves time, material, money.
- Low original cost.

Other forms from Economy are available on a rental basis.

For catalog and full address of office nearest you, write:

Economy Forms Corp.

H.P. Station, Box 128 DES MOINES, IOWA
Offices in Kansas City, Mo.; Lincoln, Nebr.;
Minneapolis, Minn.; Ft. Wayne, Ind.; Milwaukee,
Wis.; Chicago, Ill.; Cincinnati, Ohio; Cleveland,
Ohio; Metuchen, N. J.; Rochester, N. Y.;
Springfield, Mass.; Waltham, Mass.; New York,
N. Y.; Washington, D. C.; Decatur, Ga.; Bir-
mingham, Ala.; Charlotte, N. C.; Dallas, Texas;
Tulsa, Okla.; Houston, Texas; Los Angeles, Cal.;
Oakland, Cal.; Denver, Colo.



MAYO Tunnel Cars

... feature practical designs and rugged construction. All cars can be equipped with Mayo's safe, automatic couplers.

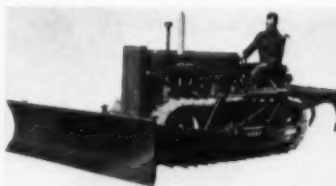
- Side Dump Car (shown) has 2½ cu. yd. capacity. 24" gage.
- Rocker Dump Car. Ideal for sticky muck or wet concrete 1 cu. yd. capacity. 24" gage.
- Tunnel Car. Box body is removable and may be hoisted to surface to be dumped into truck. ½ to 2 cu. yd. capacity. 18" or 24" gage.

FREE Bulletin No. 18 shows car details;
No. 21 illustrates Automatic Coupler.



MAYO
TUNNEL AND MINE
EQUIPMENT
LANCASTER, PENNA.

EQUIPMENT NEWS... continued



NEW BLADES—A newly designed bulldozer has been introduced by Henry for use with the John Deere 420 crawler. Two models are available: the angle-tilt dozer model ATD-1, and the straight dozer model SD-1. Both dozers have box steel push beams, outside mounted to protect blade edges. The beam pivot points are below the center line of the tractor to increase traction. The dozers operate from the tractor's hydraulic system through a single valve. The cutting edges, made of heat-treated high carbon steel, are reversible and replaceable. The angle-tilt blade is 96 in. long and 24 in. high. The blade angles 25 deg right or left, and it tilts 9 in. Double-acting hydraulic cylinders push the blade from 10 in. below grade to 52 in. above. The straight blade reaches to a depth of 15 in. below ground and lifts 42 in. above. It is 72 in. long.
—Henry Mfg. Co., Box 720, 1700 N. Clay St., Topeka, Kan.



GRADER RIPPER—The Swanson ripper is a new tool that attaches to the mold board of motor graders so that ripping can be done outside the widths of the grader wheels or outside the cutting width of the blade. According to the manufacturer the device can be used effectively on asphalt, hard pan, stratified rock, shale, and thin-slab concrete. The device is actually a boot that at-

400° F. ABOVE

**EFFECTIVE
LUBRICATION
AT MOST ANY
TEMPERATURE**

70° F. BELOW

The fact that LUBRIPLATE Lubricants are able to meet extreme temperature conditions demonstrates the ability of these products to cope with the wide variations found in everyday industry. Besides this feature, LUBRIPLATE Lubricants possess attributes not found in conventional lubricants.

HIGH TEMPERATURES

LUBRIPLATE No. 930-AA.—Provides superior and protective lubrication for all types and sizes of machines operating at temperatures as high as 500°F. Possesses exceptionally high film strength and adhesiveness. Protects all metallic parts against rust and corrosion.

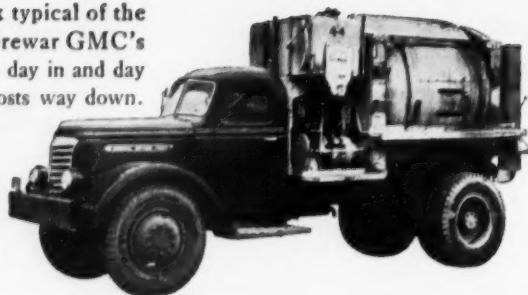
LOW TEMPERATURES

LOW-TEMP LUBRIPLATE—The outstanding multi-purpose grease type lubricant that will remain plastic at 70°F below Zero, yet has a Melting Point of 270°F. Resists water and acids—protects against rust and corrosion even from calcium chloride used on paved roads during winter months.

For nearest LUBRIPLATE distributor see Classified Telephone Directory. Write for free "LUBRIPLATE DATA BOOK"... a valuable treatise on lubrication. LUBRIPLATE DIVISION, Fiske Brothers Refining Company, Newark 5, N. J. or Toledo 5, Ohio.



Here's a transit mix typical of the Maloney group of prewar GMC's —still making money day in and day out, while keeping costs way down.



Inside story on

THE 10-YEAR-SELLING NEW GMC's



THESE FAST-STEPPING, V8-POWERED FW550's are some of the newest additions to Maloney's 94-GMC fleet. Other recent additions include new Turbopower Diesel models equipped for larger loads. These newest trucks are proof on wheels of Maloney's satisfaction with GMC's—used consistently in his fleet for more than 25 years.

OLD TRUCKS BY THE SCORE

***Maloney Concrete's veteran transit mixers help explain
the biggest tandem sales in all GMC history***

MALONEY CONCRETE, of Washington, D. C., has experience with GMC transit mixers that dates back to the '30's.

"GMC built 'em the way we wanted 'em" is their reason. The same reason applied to later purchases that account for Maloney's present 94 GMC units.

And GMC's way of building those trucks is responsible for operation records that have the construction field talking today. For a group of Maloney's older transit mixers—some ten years old, some up to 17—have histories that show downtime—except for normal maintenance—as

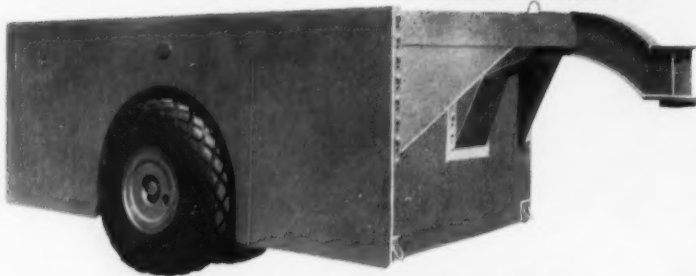
a rarity. And all upkeep costs have been amazingly low.

So low, in fact, that construction haulers have been trekking hundreds of miles to study the actual records—and the veteran GMC trucks that made them. What's more, they've been going home and buying GMC tandems—at the fastest clip in all GMC history.

And remember—seven big GMC super-tandems blanket the 40,000-63,000 GVW field. In any one of them, you get the top truck—and top truck-ability—your money can buy. Check that at your GMC dealer's!

GMC TRUCK & COACH—A General Motors Division

PULL IT WITH RUBBER!



Versatility

Meet latest specifications for high speed compaction with Tambo 50 ton models designed to get full power from rubber tired tractors. Efficient on wet, silt and clay fills.

Stock Tongues

Interchangeable tongue designs for two and four wheeled tractors make proper connection to the tractor king post. Available for Euclid, Caterpillar, and Model C Tournamatic. Write today for other models.

Wheel oscillation gives equal pressure and kneading action. Tire air pressures from 90 to 150 psi compact soft spots and voids.



MANUFACTURING COMPANY

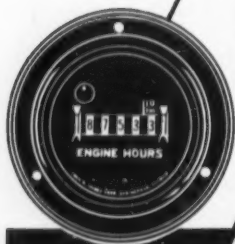
DEPT. 3 • P. O. BOX 2340 • 1146 W. LAUREL ST.
SAN ANTONIO, TEXAS • PHONE: PE-3-9171

**For better performance and longer service
get protective maintenance done *On time!***



Hobbs ENGINE HOUR METERS TAKE AWAY THE GUESSWORK

Beat down-time through timely maintenance . . . know WHEN lubrication, oil change, overhaul, etc., are due. Today's engineers recommend maintenance in terms of operating time instead of distance . . . the Hobbs Engine Hour Meter provides that information. Not a revolution counter, but a true electric timing instrument recording HOURS and MINUTES. Ruggedly built . . . simple to install . . . easy to read. For both gasoline and diesel engines. Approved and recommended by leading manufacturers. See your factory branch, representative, distributor . . . or WRITE:



JOHN W. **Hobbs** CORPORATION

2070 YALE BLVD.

SPRINGFIELD, ILLINOIS

A DIVISION OF



EQUIPMENT NEWS...

continued

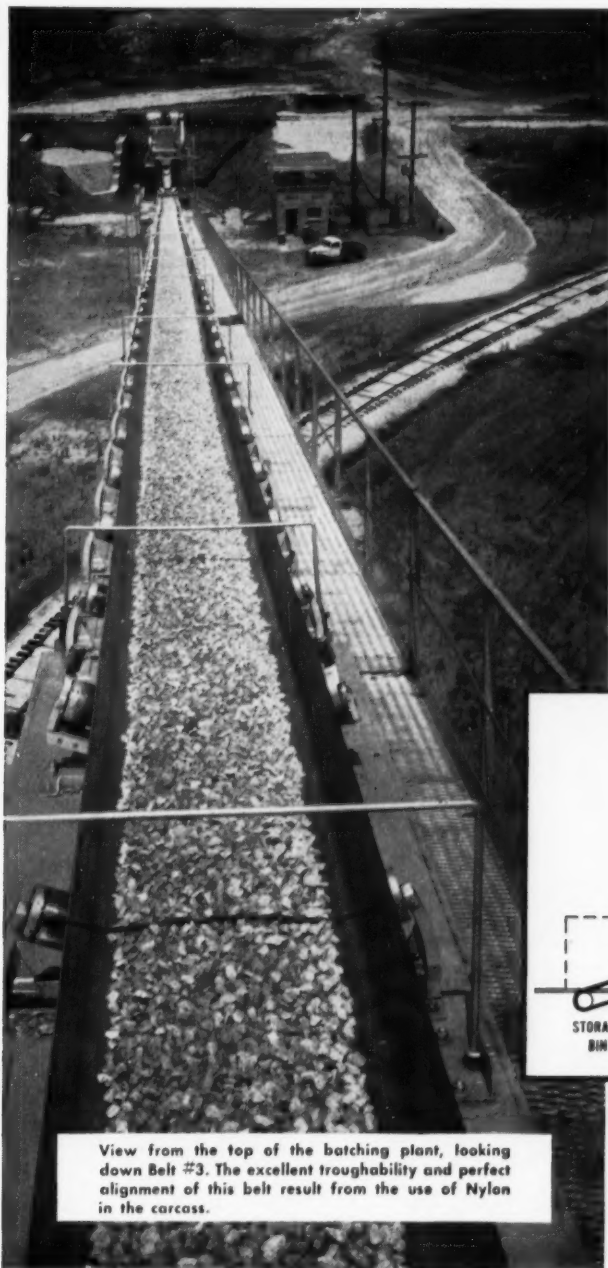
taches to the moldboard and takes a standard make ripper shank. It is now being manufactured in two models for use with the No. 12 Cat grader. When not in use the ripper can be inserted in the boot with the point up on one model, and on the other model, the boot swings out of the way so that it can be carried by the grader when not in use. Both rippers have a 10-in. digging depth.—Swanson Mfg. Co., 515 63rd St., San Diego 14, Cal.



SAND BLASTER—Air Placement Equipment Co.'s new 650-lb Jet Blaster sand blasting machine is designed for heavy duty jobs such as removing corrosion, paint, scale or concrete. It features an adjustable flow control and it can handle all conventional abrasive materials. A nozzle for wet sand blasting, as well as remote controls, are available as optional equipment. — Air Placement Equipment Co., 1009 W. 24th St., Kansas City, Mo.



RUGGED FORK LIFT—Clark Equipment Co. has expanded its Ranger line of fork lift trucks for off-road materials handling with the addition of the model



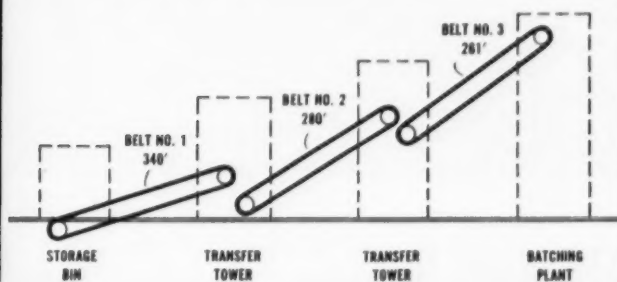
View from the top of the batching plant, looking down Belt #3. The excellent troughability and perfect alignment of this belt result from the use of Nylon in the carcass.



CONVEYOR BELTS

**Push-Button Control
and U. S. Conveyor Belts
help turn out
120 cu. yds. of concrete
per hour**

FLOW CHART OF CONVEYOR BELT SYSTEM.



hungry jaws of the huge batching plant.

One man in a control tower oversees the entire operation, from storage pits to plant bins. The control board tells him when a bin is getting low. By pressing a button he can start one of the three U. S. Belts hauling sand, stone, or other aggregates to the proper bin. "We expect many years' service from these belts," adds the plant's president, J. Roy "Cap'n" Pennell.

"This is the largest concrete plant* of its type in the world," says the plant's manager. "In aiming to turn out the best concrete at the lowest possible cost we require a highly mechanized operation."

And that's what this plant has. Almost 2,000 feet of U. S. Rubber's 30" wide U. S. Matchless patented Style XN conveyor belting carries raw materials through the reclaiming tunnel, then up a steep grade to a turn head—electrically controlled—and finally discharges the cargo into the always-

This is another good example of U. S. Rubber's Three-Way Engineering, in which "U. S." engineers work as a team with the plant engineers and the conveyor system engineers . . . to obtain the *right* belt for the job. This type of assistance, plus a complete line of conveyor belting, can be obtained at any of our 28 District Sales Offices, or contact us at Rockefeller Center, New York 20, New York.

In Canada, Dominion Rubber Co., Ltd.

*Greenville Concrete Co., Greenville, S. C.



Mechanical Goods Division

United States Rubber

Digging Foundation Footings...



Digging footings as well as grading, this Crawler-Mounted, multi-purpose Gradall speeds completion of Detroit's new, modern parking garage located under Grand Circus Park.

Gradall increases production 300% — saves \$350 a day — for Canonie Construction Co., South Haven, Michigan

Gradall cuts costs on all these jobs — and more!

- Hand finishing and clean-up
- Excavating and loading
- Trenching and backfilling
- Snow and ice removal
- Ditch digging and cleaning
- Grading and sloping
- Materials handling
- Loading boulders
- Placing culverts, tanks, curbs, etc.

CANONIE Construction Company, South Haven, Michigan, used Gradall's power and accuracy to dig irregular-shaped footings for Detroit's new underground parking garage in Grand Circus Park. Working in sticky blue clay, Gradall rapidly carved footings 17 feet wide by 2 feet, 3 inches deep.

Previously, five men working with shovels, picks and compressor tools could complete only one footing a day. With a Gradall on the job, 4 footings a day were easily

excavated, plus fine grading between footers — at an estimated saving of \$350 a day.

This report is typical of the cost-cutting jobs being handled daily by Gradalls throughout the country. Why not find out for yourself. Arrange for an on-the-job demonstration by calling your nearest Gradall Distributor today.



*Distributors in over 75 principal cities
in the United States and Canada*

YOU CAN DO IT BETTER, FASTER, FOR LESS WITH A GRADALL

EQUIPMENT NEWS...continued

150, a pneumatic-tired, 15,000-lb capacity unit. With four-wheel drive, power steering, power shifting, and an oscillating rear axle, the Ranger is designed specifically for off-the-road conditions. The power train combines a torque converter with a four-speed power-shift transmission. A 95-bhp gasoline engine or 102-bhp diesel engine are available. The oscillating rear axle feature permits either rear wheel to ride over 16-in. high obstructions without any wheel losing ground contact. The new truck has a top speed of 25 mph both forward and reverse, 14 in. of underclearance, and a 108-in. wheelbase. It weighs 26,740 lb empty.—**Industrial Truck Div., Clark Equipment Co., Battle Creek, Mich.**



LINE LEVEL—A pocket-sized hand-sighting level, designed for foreman or other supervisors, provides a level line of sight for laying out building lines, drainage lines, or other installations. The device is used like a telescope. When the bubble at the top of the instrument is centered, so is your line of sight. A gage measures the difference in elevation between two points. The instrument is guaranteed to be accurate between 1/3 of 1 deg. Priced at \$2.50, they can be ordered direct from the manufacturer.—**Edmund Scientific Co., Barrington, N.J.**

ENGINES IN PAIRS—To meet the need for power plants that form a comparatively small package, the Detroit Diesel Engine Div., of GM has developed its first multiple turbocharged unit. The new plant consists of two Series 71 six-cylinder Turbopower engines mounted on a common base and driving a single output shaft. The multiple unit has a basic engine rating of 472-hp at 2100 rpm.—**Detroit Diesel Engine Div., GMC, 13400 W. Outer Drive, Detroit 28, Mich.**

continued on next page



REALLY PORTABLE POWER TROWELS

Now you can float, level, or finish with either the 24" Kelley Bantam, weighing only 75 lbs., or the 29" Kelley Boy, 90 lbs.

Small, but, man, can they turn out the work! Both machines have four wide-sweep combination blades which are used for both floating and finishing. Blade pitch is easily changed during operation by a click-stop adjusting lever.

Perfect balance and low center of gravity assure easy operation... no pulling, tugging, or gyrating to tire you. Design is simple; nothing to go wrong... equipped with Timken bearings... one-point lubrication... easy to clean... simplified maintenance.

Larger sizes also available — Kelley Hydra-Trowels 34" and 44" sizes.



MACHINE DIVISION

283 Hinman Ave., Buffalo 23, N. Y.

- ☐ Please tell me more about the Kelley Bantam and the Kelley Boy.
- ☐ Also send me information on larger sized Kelley machines.

Name

Street

City State



3-yd Hoe Digs Deep

TO MEET THE DEMAND for a bigger capacity, deeper digging hoe, Link-Belt Speeder Corp. has introduced a 3-yd model for its K-608 excavator. The K-608 now mounts shovel, crane, clamshell,

dragline, and hoe. The hoe's 30-ft boom, plus its arm and bucket, give it a maximum reach of 51½ ft and a digging depth of 31 ft 10 in. — Link-Belt Speeder Corp., Prudential Plaza, Chicago 1, Ill.



Smaller Jersey Spreader

DESIGNED SPECIFICALLY to handle the smaller paving jobs, a new version of the popular Jersey Spreader will lay up to 12 tons per min. The spreader is designed for a prime mover equal in size to Caterpillar's D4 and D6, Allis-Chalmers' HD-6 and HD-9, and the International's

TD9 and TD14. Hooking up is simple and can be accomplished in 30 min, according to the manufacturer. Although only 10 ft wide, the new model 90 will spread in widths of from 9 to 12 ft. It has a maximum spreading depth of 12 in. — Tractor Spreader Co., Hasbrouck Heights, N.J.

NEW EQUIPMENT ... continued



Measures Tension Up to 100,000 lb.

A NEW MODEL of the Skidmore-Wilhelm hydraulic impact wrench calibrator will measure bolt tension from zero to 100,000 lb and handle bolt sizes ranging up to 1¼ in. Called the model ML, the wrench comes with a set of adapters and bushings to fit most standard sizes of high tension bolts.

Like predecessor models, the calibrator makes use of a hydraulic principle. To make a bolt tension test or to calibrate an impact wrench the operator places a bolt in the tester. The bolt is then tightened with the impact wrench and hydraulic pressure transfers the tension produced to the meter, which is a direct reading dial.

The model ML can be attached easily to a girder or other handy outside structure for use. It features a new shock resistant device designed to protect the gage against impact when power wrenches are being calibrated. — Skidmore-Wilhelm Mfg. Co., 442 South Green Road, Cleveland 21, Ohio

continued on page 271



“Excellent hoisting qualities... a wonderful machine”

reports R. Litz & Sons Co., Ltd.

Back in December, 1955, R. Litz & Sons Co., Ltd., of Winnipeg, Canada, bought a Lima Type 44 Crane to do the heavy lifting in its building and machinery moving business. Gordon Litz says: “We have found the hoisting qualities of this machine to be excellent. It is also superb for deep trenching when equipped as a pullshovel; we are pleased to express our opinion of the excellent qualities found in our Lima machine.”

You will find satisfied owners wherever Limas are found, around the world. For materials handling, excavating or whatever the job, contractors who want speed, reliability and extra capacity all say the same thing. Here are some of the specific reasons why Limas lead the field:

1. *Piston-ring-type dirt seals and retainers in the crawler rollers.*

2. *Moving parts are flame or induction hardened for longer life.*
3. *Main machinery is placed well behind the center of rotation.*
4. *Anti-friction bearings at all important bearing points.*
5. *Big capacity drums and sheaves—easy on cables.*
6. *Propel and swing gears and power take-off are enclosed in a sealed oil bath.*
7. *Torque converter optional on certain types.*
8. *Wherever you are, you can depend on skilled service and nearby warehouse stocks of parts.*

If you want the best in shovels, cranes or draglines working for you, it will pay to check the complete line of wagon, truck and crawler-mounted Limas . . . designed and built to give you stamina and long profitable operation on every job. See your nearby Lima distributor, or write Construction Equipment Division, Baldwin-Lima-Hamilton Corporation, Lima, Ohio.

DISTRIBUTORS IN PRINCIPAL CITIES OF THE WORLD

LIMA

SHOVELS • CRANES
DRAGLINES • PULLSHOVELS



BALDWIN-LIMA-HAMILTON
Construction Equipment Division — LIMA WORKS

OTHER DIVISIONS: Austin-Western • Eddystone • Electronics & Instrumentation
Hamilton • Loewy-Hydropress • Madsen • Pelton • Standard Steel Works



*High-production excavating and trenching
with the HYSTER*

D4 HYDRAULIC BACKHOE

combination backhoe and bulldozer



Using dozer blade, this machine clears way to job site, performs many rough-grading, leveling and backfilling chores without added equipment.

COMPARE THESE PERFORMANCE BENEFITS

then see a working demonstration

Designed specifically for Caterpillar-built D4 Tractors.

Develops approximately 4 tons digging force at the teeth and balanced by tractor weight to use it all.

Simultaneous swing and hoist at full hydraulic pressures from separate pumps.

Large hydraulic capacity for continuous, all-day operation without overheating.

Track-type tractor mobility retained by exclusive patented equalizer arrangement.

Hyster's hoe, mounted on a Caterpillar D4 Tractor, will go anywhere to get at the tough jobs. It gives you all the advantages of a combination excavator-bulldozer with full track-type tractor mobility. Handles all kinds of utility trenching and digging jobs at low cost. Everything about this rugged machine is engineered for performance far beyond the capacity of other hydraulic backhoes.

**Call your Caterpillar-Hyster® Dealer
for demonstration.**

HYSTER COMPANY

**D4 BACKHOE MAKES MORE
JOBS "ONE MACHINE" JOBS**



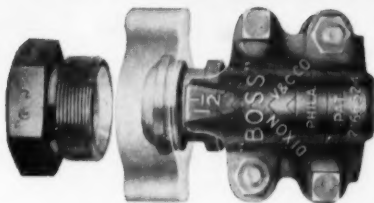
Caterpillar is a registered
Trademark of Caterpillar
Tractor Co.

2921 N. E. CLACKAMAS ST.....PORTLAND 8, OREGON
1821 N. ADAMS STREET.....PEORIA 1, ILLINOIS
PORTLAND, OREGON; PEORIA, ILLINOIS; NIJMEGEN, THE NETHERLANDS

*Safest Connections
for Pile Driver Hose
AND OTHER STEAM, AIR, WATER
AND HYDRAULIC APPLICATIONS*

"GJ-BOSS"

**GROUND-JOINT
FEMALE
COUPLING
STYLE X-34**



The original washerless coupling that is unequalled for safety in every high pressure service, and will therefore serve with exceptional efficiency and economy on all low-pressure applications. Built to withstand hard use and rough handling. Ground-joint union between stem and spud provides leak-proof, trouble-free seal...no lost or worn-out washers to replace. All parts malleable iron or steel, thoroughly rustproofed. Furnished with super-strong "Boss" Offset and Interlocking Clamps. Sizes 1/4" to 6", inclusive.

**COMPANION
MALE COUPLING
"BOSS", STYLE MX-16**



Companion coupling for "GJ-Boss", described above, and "Boss" Washer Type Couplings Style W-16. Will prove equally efficient and economical for all applications where standard iron pipe nipples are normally used. Each size fits same size hose...oversize hose not required. Coupling consists of I.P.T. male stem and "Boss" Offset and Interlocking Clamp. Steel or malleable iron, thoroughly rustproofed. Sizes 1/4" to 6", inclusive.

Stocked by Manufacturers and Distributors
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DIXON VALVE & COUPLING CO., LTD. TORONTO Associate Companies
Buck Iron Company, Inc. Quakertown, Pa. • Peapack Iron Works, Inc. Peapack, N.J.

EQUIPMENT NEWS...continued



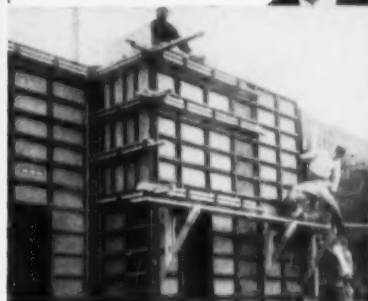
NEW LOW BED—LaCrosse's new low bed trailer features a removable gooseneck that doesn't require hydraulic or cable lifts. Instead, the trailer bed is raised and lowered by means of a ramp mounted on the rear of the tractor. Two standard fifth-wheel couplings—one on the tractor and one on the front deck of the trailer—are used to attach the gooseneck to the trailer and tractor. For unloading, the front of the trailer is lowered directly to the ground by releasing the tractor fifth-wheel and slowly driving the tractor forward. Two hinged gooseneck strirrups are raised and the tractor is again backed under the gooseneck. The tractor king pin is relocked and after the trailer king pin has been released, tractor and gooseneck are driven forward so that equipment can be unloaded off the front end. Capacities ranging from 25 to 75 tons are available.—LaCrosse Trailer Corp., LaCrosse, Wis.



BATCH TRIPPER—A new hydraulic batch tripping mechanism, controlled by the driver from within the cab, allows batch trucks to be backed into the paver skip with the body already raised. Then the driver presses the tripper dash control and the selected batch is instantly released. Partitions are re-locked by the driver while returning to the batch plant. The device does away with the need for the man who usually does hand tripping and re-locking. The hydraulic

"We Make Time & Money By Using Compo Forms"

W. H. Alexander,
H. B. Alexander & Son, Inc.
Harrisburg, Pa.



"We first used Compo forms over a year ago for the deep basement area and for grade beams for the new Service Center of the Pennsylvania Light & Power Co. Although this work was done during the winter, requiring heat for curing, we advanced our schedule with ease by the use of Compo forms. Since then we have also made time and money by using these forms for foundations for a church, a school, a shopping center and a swimming pool."

ATLAS COMPO FORMS

Labor-saving Atlas Compo Forms are backed with a CASH GUARANTEE OF SAVINGS. Get in touch with us now about your next job.

**IRVINGTON
FORM & TANK CORP.**

20 Vesey Street
New York 7, N. Y.



\$7.07 - a week

**PUTS A SET LIKE THIS
ON YOUR WORKBENCH**

5164-GS-B

164-pc tool set

\$34.45 down

Only \$7.07 a week

Prices subject to
change without notice.

NOW... every mechanic can own
Snap-on Tools with
Snap-on's new pay-as-you-earn plan

Yes, it's a fact men — you can be earning more money today with the *Snap-on* tools you pay for tomorrow.

TEN PERCENT DOWN puts any *Snap-on* tools to work for you. That's all it takes to start using the world's finest tools and shop equipment.

LOW MONTHLY PAYMENTS fit into most everyone's budget . . . make it easy and convenient to own *Snap-on* tools. Only a few dollars a month puts these tools to work for you.

UP TO 20 MONTHS TO PAY THE BALANCE, keeps payments low. The *Snap-on* Credit Plan offers a choice of payment periods. Under this plan, every *Snap-on* set is within reach of all mechanics.

It will pay you to investigate how easy it is to own and use *Snap-on* tools and shop equipment. The *Snap-on* man can give you the simple details in a few minutes. Ask him about it.

ATTENTION SUPERVISORS

Be sure to pass this advertisement to your mechanics.

SNAP-ON TOOLS CORPORATION

8042-F 28th Avenue • Kenosha, Wisconsin

*Snap-on is the trademark of Snap-on Tools Corporation.



EQUIPMENT NEWS . . . continued

tripping units, one for each partition are mounted under the body floor. They can fit easily within the depth of a 4-in. crossmember. A compact valve manifold, installed under the dashboard, is used by the driver for releasing and re-locking the batch partitions. Manifolds and tripper units are connected by a one-piece flexible line that minimizes the possibility of leaks. The trippers are powered by the regular hoist pump. A diversion valve, lever-operated from the truck cab, directs hoist pump output to the trippers or the hoist as required. —**Hercules Steel Products Co., Galion, Ohio.**

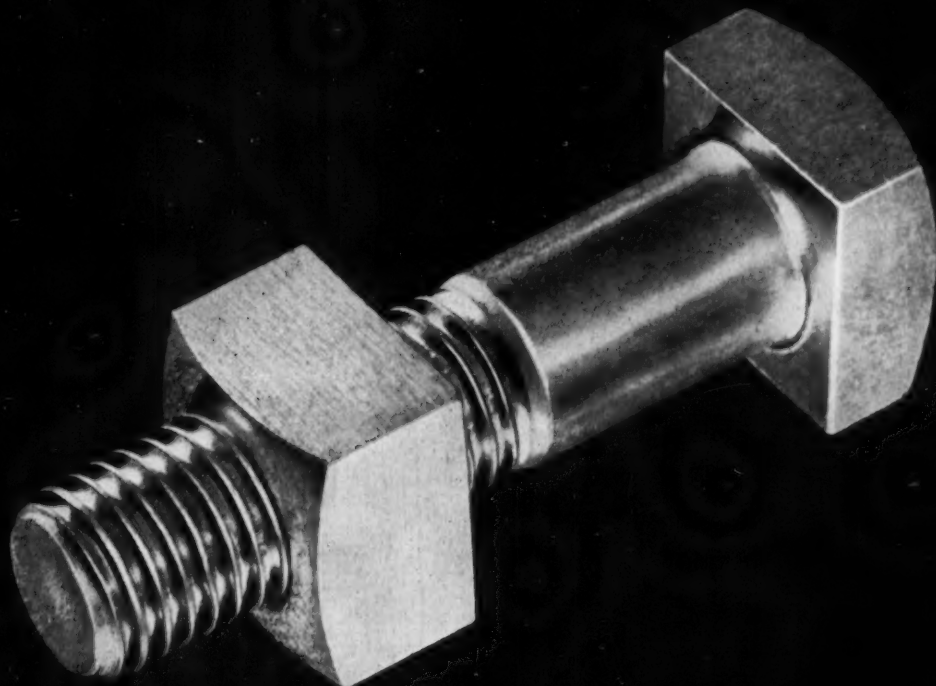


TRACTOR-PULLED SPRINKLER

A new 6,000-gal capacity semi-trailer sprinkler tank, designed for use with the single-axle Caterpillar DW21 tractor, is now available from Southwest Welding and Mfg. Co. Mounted on large 29.5x29 tires, the sprinkler affords good flotation on even the softest fills. Called the STT-60, the trailer is 10 ft wide and 11 ft 10 in. high. The tank section is 18 ft long. Wheelbase of the trailer is 27 ft 3 in., and the overall length of the tractor and trailer is 45 ft. The front and rear spray bars are equipped with adjustable nozzles that have a spray swath of 55 ft. The 1500-gpm spraying pump is a 6-in. self-priming model powered by a six-cylinder gasoline engine. Simple air-actuated controls are regulated by the tractor operator. — **Southwest Welding & Mfg. Co., 3201 W. Mission Rd., Alhambra, Cal.**

OTTAWA ATTACHMENTS

Two new attachments, a pallet fork and a clamp fork, have been designed to interchange easily and quickly with the bucket of Ottawa front end loaders. The clamp fork can be used to load, or to transport and stack logs, piling, lumber, or any material requiring a hold-down device. The hydraulically actuated clamp



The Bethalume process produces an unusually uniform coating, ensuring clean threads for good fit.

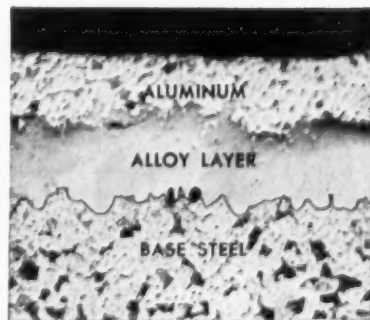
Bethalume Coating Gives Fasteners Better Resistance to Corrosion

Fasteners used in corrosive atmospheres have a much longer service life, and require little or no maintenance, when protected by Bethlehem's Bethalume coating—a hot-dip coating of pure aluminum.

The Bethalume coating is effective in enabling fastener items to withstand the effects of corrosive atmospheres because it adds the permanence of aluminum to the

strength of steel. The coating is tightly bonded to the base steel, and is uniform over the entire surface of the fastener. The coated threads are clean and smooth-fitting.

Why not look into the advantages of the Bethalume coating for your fasteners applications? A telephone call to the nearest Bethlehem sales office will bring one of our representatives to your desk promptly.



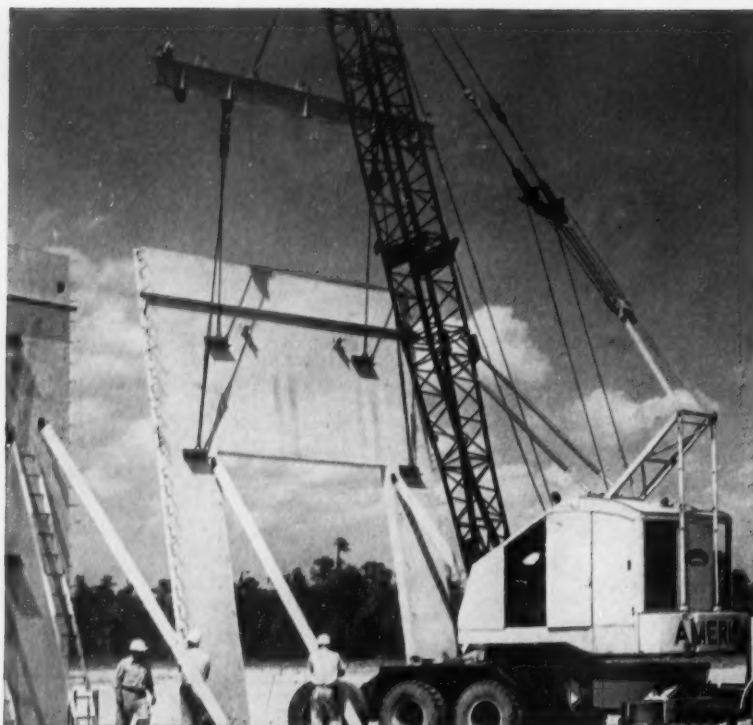
Photomicrograph of Bethalume coating. Pure aluminum is bonded to base steel by iron-aluminum alloy.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

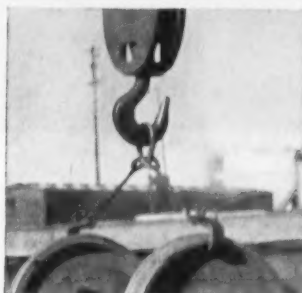
*On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation
Export Distributor: Bethlehem Steel Export Corporation*

BETHLEHEM STEEL





TILT-UP HANDLING SIMPLIFIED WITH CROSBY-LAUGHLIN SHACKLES



DROP FORGED RINGS OFFER GREATER SAFETY

Wire rope and chain sling safety is substantially increased by replacing welded links and rings with drop forged Crosby-Laughlin* Rings, Sling Links and End Links. Safety-conscious construction men demand these weldless, heat treated fittings because of their greater strength and reliability on every lifting job! Crosby-Laughlin Weldless Rings and Links are available with stock diameters up to 1 3/4". Your distributor has detailed specifications on sizes and capacities.

*REGISTERED TRADEMARK

World's most complete line of drop forged fittings for wire rope and chain

CROSBY LAUGHLIN LEBUS

FORT WAYNE 1, INDIANA

Handling tilt-up panels—almost any material—is made easier by using quickly adaptable shackles. You'll find them used everywhere, on every job!

Experienced construction men, miners and earth movers know that drop forged Crosby-Laughlin* Shackles give them reliable, long life performance with maximum safety for men and materials.

Vitaly important to shackle safety is *perfect alignment* of pin holes that distribute load forces equally over the bow. Crosby-Laughlin Chain and Anchor Shackle pin holes are precision drilled in close tolerance jigs. Oversize pins, larger in diameter than the bow, resist shearing under shifting or shock loads.

For safety's sake, insist on genuine Crosby-Laughlin Shackles—manufactured under strict quality control—in a complete range of sizes from 3/8 to 3 inches.

A complete line of quality drop forged Crosby-Laughlin fittings is available from leading construction equipment distributors. They also have descriptive catalogs containing technical and engineering specifications on this line.

EQUIPMENT NEWS . . . continued



closes down to the forks and opens to a height of 8 1/2-ft from the tip of the clamp to the tip of the fork. The pallet fork attachment is held by the same four pins that normally carry the bucket. According to the manufacturer, it can be interchanged with the bucket in 15 min. The pallet fork attachment, equipped with a rear guard to prevent the load from rolling back, has a tilt-back angle of 18 deg and a dumping angle of 40 deg at full height. Both the pallet fork and the clamp fork are available in 30, 36, 42, 48, and 54-in. lengths and in 48 and 64-in. carriage widths. —Ottawa Steel Div., L. A. Young Spring & Wire Corp., Ottawa, Kan.



PROTECTS AIR TOOLS—A new series of line oilers for air tools and rock drills has been made available from Davey Compressor Co. Their application is said to cut down on lubrication troubles and to increase tool life. Available in 1/2-pt, and 1 and 2-qt sizes, the oilers operate on the so-called drop-in-pressure principle. When an air tool throttle is closed, the air hose and oiler oil chamber builds up to maximum line pressure. Then, when the throttle is opened, line pressure in the hose drops slightly and reducing pressure in the oil chamber carries oil through a suction tube into the air hose. This assures that an ample supply of oil will be supplied at the start of



"THE HARDEST, BLOCKIEST ROCK WE EVER ENCOUNTERED", is how foreman described 805,000 cu. yds. of dense mica schist excavated along a 3.8-mile section of Connecticut Turnpike. Up

to 30,000 lbs. of explosives were used in a week to shoot 30,000 yds. of rock. Thirteen big compressors, 9 of them Jaeger "600's", supported four 2 1/2 yd. shovels.

How Jaeger "600's" sped Turnpike rock job

Excavating in lifts averaging 15', Slattery Contracting Co., Inc., Maspeth, N. Y., worked fast to move 805,000 cu. yds. of hard rock on the Connecticut Turnpike. The largest cut, 58', was taken down in two lifts of 30' and 28'. Drilling was done in three patterns: 8'x8', 7 1/2'x7 1/2' and 6'x6'—a lot of footage. To assure plenty of reserve air for "hurry-up" production, a typical drilling spread teamed two Jaeger "600" Rotaries with three 375 cfm track-mounted drills, providing 400 cfm of 100-lb. air per drill. In other combinations, three Jaeger "600's" powered three and sometimes four 450 cfm track-drills.

Operating at their characteristic slower speed, nine efficient Jaeger "600's" maintained top drilling production for long hours, including double shifts. Full load speed of the Jaeger "600" is only 1650 rpm (100 to 150 rpm slower than other "600" compressors using the same Model 6-71 GM diesel engine), which reduces fuel consumption and engine piston travel and saves up to 9000 compressor revolutions per hour.

Other Jaeger rotaries (125, 250 and 365 cfm) give you this same slow-speed, high-efficiency performance—1700 rpm at full load instead of 1800 to 1950. See your Jaeger distributor, or write for Catalog JCR-5.



JAEGER "365" SPEEDS WORK, TOO: Drives 6 Thor #25 heavy duty breakers with full 100-lb. air wallop to finish job in a hurry at a busy Philadelphia traffic intersection. No "old standard 315" compressor has the capacity to do such a fast job. Putting out 50 cfm more air, the Jaeger "365" operates at a fuel-saving, compressor-saving 1700 rpm at full load—100 rpm slower than any "315" unit.

THE JAEGER MACHINE COMPANY

800 Dublin Avenue, Columbus 16, Ohio

PUMPS • CONCRETE MIXERS • SPREADERS • FINISHERS • TRUCK MIXERS

300% MORE VISIBILITY



YALE

WIDE ANGLE VISION



**Premium Engineering Features—
Included as Standard—Give Top Performance
Under Toughest Conditions:**

- I-beam side members in frame for extra strength.
- Channels mounted on ball-bearing rollers to reduce friction and wear.
- All controls conveniently located.
- Power steering and power brakes.
- Yale Fluid Coupling or standard transmission.
- Designed for a complete set of attachments, engineered for minimum loss distance.

CAPACITIES: 15,000 to 20,000 lbs.

IN NEW HIGH-CAPACITY GAS TRUCKS FOR EASY HANDLING OF CONSTRUCTION MATERIALS

Operator sits high and in center. Upright channels are wide-spaced, nested to reduce frontal obstruction. Right next to them—the hoisting cylinders, one right, one left. Chains that raise carriage are in front of cylinders—out of the arc of vision. Carriage has one top bar, one bottom bar—good visibility between them at all levels of fork lift. Result: Yale's exclusive "Wide-Angle Vision" assures safer, faster, more efficient handling of heavy loads.

GREATER STABILITY...FAST CYCLE OPERATION

New Yale High-Capacity Gas Trucks have low center of gravity, with high underclearance, and a broad lifting base afforded by two ball-mounted lift cylinders. To further increase stability factor, there is wide channel-roller spacing at all points of lift, plus side-thrust rollers on channel and carriage. Large-size, high-flotation tires give good traction. For fast cycle operation, these trucks have lifting speeds up to 60 feet per minute...fast, safe lowering...travel speeds up to 20 MPH...excellent maneuverability.

YALE*

*REG. U. S. PAT. OFF.

YALE & TOWNE

INDUSTRIAL LIFT TRUCKS AND HOISTS

GASOLINE, ELECTRIC & LP-GAS INDUSTRIAL LIFT TRUCKS • WORKSAVERS
WAREHOUSERS • HAND TRUCKS • HAND AND ELECTRIC HOISTS

YALE MATERIALS HANDLING DIVISION, A DIVISION OF THE YALE & TOWNE MANUFACTURING CO. MANUFACTURING PLANTS: PHILADELPHIA, PA.; SAN LEANDRO, CALIF.

To meet the need of expanding industries for better materials handling methods and equipment, look to Yale for advances in research, engineering, manufacturing, sales and service—as

YALE BUILDS FOR THE NEW ERA

The **YALE & TOWNE** Manufacturing Company
Roosevelt Blvd., Philadelphia 15, Pa., Dept. A-336
Please send the new Yale High-Capacity Gas Truck
brochure No. 5230.

Name _____ Title _____
Company _____
Address _____
City _____ Zone _____ State _____

*In Canada: write The Yale & Towne Manufacturing Co.,
St. Catharines, Ontario, Canada*

LOOK TO **WILLSON** for another new development in head protection!



**NOW—SUPER-TOUGH
PHENOLIC
SAFETY HATS AND CAPS**

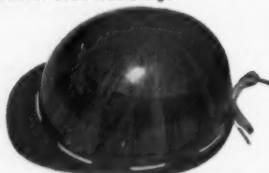
FROM THE WILLSON RESEARCH CENTER now comes the "Phenolic" line of scientifically designed safety headgear that meets all specifications with ease!

In this Super-Tough line are safety developments so outstanding that you'll find it offers unequalled value. For instance, the famed "geodetic suspension" and the unique pneumatic headband are obtainable in both adjustable *lace-in* and *snap-in* types of hats and caps.

Ask your Willson distributor to demonstrate the heavy duty Phenolic line that combines comfort and maximum head protection. Or write for latest "Super-Tough" bulletin describing them in detail.

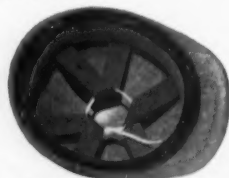
Strongest Made!

See how it's built up from 24 individual die-cut pieces into a sturdy Phenolic pattern that withstands repeated 80-foot-pound drop ball tests without even fracturing!



LACE-IN SUSPENSION

Both hats and caps are available with convenient lace-in suspension feature. Easily adjusted for snug comfort to any head size.



SNAP-IN SUSPENSION

Handy Center-Tie snap-in type suspension is also obtainable in Super-Tough hats and caps. Willson's exclusive patented "Geodetic Suspension" and Pneumatic Headband can be had in any style!

WILLSON



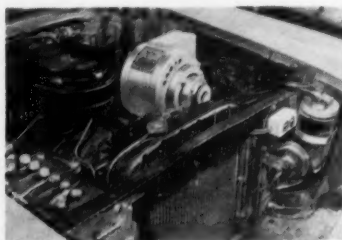
Over 300 safety products carry this world-famous trademark

**PRODUCTS DIVISION
RAY-O-VAC COMPANY**

141 Thorn Street, Reading, Pennsylvania

EQUIPMENT NEWS...continued

operation, and that an even flow will continue as a result of normal air pulsations. A needle valve provides precision control of the amount of oil fed to a tool. There are no working parts to wear out, and cast aluminum housings keep down the weight of the oilers. —Davey Compressor Co., Kent, O.

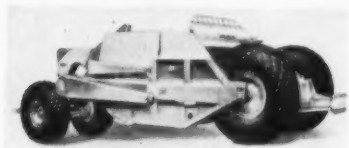


AUXILIARY POWER—A heavy-duty electric generator, which can be installed under the hood of trucks or tractors, provides 115-v ac power for either emergencies or to operate electric tools. Called the Electrol Generator AC, the generator can be mounted on and driven by most truck and tractor engines. A mounting kit is available from the manufacturer. The unit is mounted on a bracket attached to the engine and connected by belt to the engine crankshaft pulley. The generator contains only two moving parts, the rotating field and an electric clutch. It operates only when the control switch is turned on. When electricity is needed, the operator turns a switch on the instrument and sets the engine throttle so that the control meter registers at the operation line. The unit sells for \$325. A smaller unit sells for \$198.—Electric Controls, Inc., Wales, Wis.

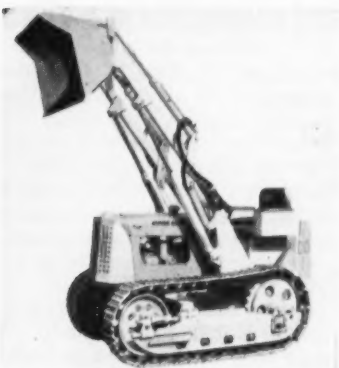


30-IN. DIPPER—Renner's new ¾-yd cast-welded trenchhoe dipper is designed to fill the need for a rugged 30-in. wide trenching tool. The dipper features a new lip design and a one-piece heat-

treated alloy bottom casting that will last through tough digging chores. The sloping-back construction of the dipper is said to eliminate heeling and add to dumping speeds. The dipper will fit any make machine, according to the manufacturer. With four 7½-in. teeth, the dipper weighs 1350 lb.—Renner Mfg. Co., Box 125, Butler, Wis.

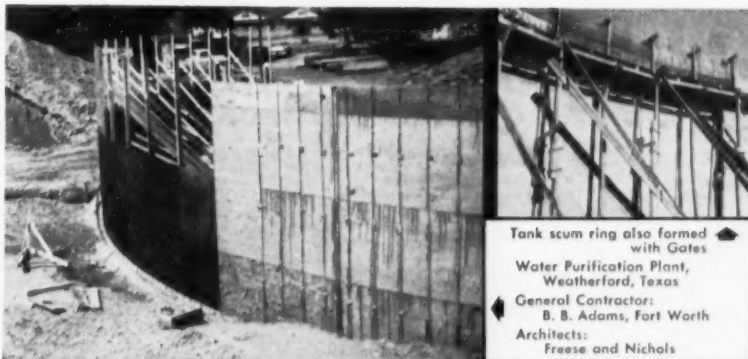


D9 SCRAPER—Caterpillar has introduced a large tractor-drawn scraper for use with its D8 and D9 crawlers. Called the No. 491, the new unit replaces the No. 90 scraper in the company line. Its payload capacity is 82,000 lb, or 12,000 lb more than the No. 90. The new scraper has a struck capacity of 27 yd and a heaped capacity of 34 yd—a 26% increase over the former model. Another feature of the No. 491 is the increased apron opening, which provides 15 additional inches of opening over its predecessor model. This feature, together with higher bowl sides, permits easier handling of the scraper's larger loads. The rig is equipped with 24:00x29, 24-ply tires on the front and 27:00x33, 24-ply on the rear. All are tubeless tires.—Caterpillar Tractor Co., Peoria, Ill.



OLIVER LOADER—A new high-speed loader is now available for the new Oliver OC-46 tractor. Built as an integrated unit, the loader has a ¾-yd bucket, and the tractor features a 22-dbhp

"Costs substantially reduced..." with Gates Circular Tank System



Tank scum ring also formed with Gates
Water Purification Plant,
Weatherford, Texas
General Contractor:
B. B. Adams, Fort Worth
Architects:
Freese and Nichols

"...the walls were formed to a true radius, giving us a circular wall and not a wall consisting of a series of flat surfaces. We formed the two large tanks without plates cut to the radius and without walers, effecting a substantial reduction in labor and material costs.

"The quality of the finished concrete was as fine as we have ever seen."

(signed) B. B. ADAMS,
General Contractor

You, too, can save money on the job with the speed and versatility of Gates Systems. For detailed information, see your nearby Gates Dealer, or write to



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Architectural
File—21-G
CMAA 857

GATES & SONS, INC.

80 SOUTH GALAPAGO • DENVER 23, COLORADO

Correctly engineered to bear heavier loads, lengthen rope- life, reduce maintenance costs



• Because they're designed and engineered for specific tasks, you'll find MADESCO blocks with heavy steel-shells and fittings your *safest* choice. In materials, in construction too, Madesco tackle blocks assure you the extra service that comes from over thirty years of specialized experience and "know-how." Buy Madesco blocks and you make substantial savings on your rope costs, because Madesco sheaves (of iron or steel graphite bronze) are correctly-grooved to prolong rope-life. Loads travel smoothly, easily, quickly to save lifting time; that means savings too that come from minimized maintenance and down-time. There's a complete line of Madesco tackle blocks for every need. Consult your industrial distributor—and meantime write for our catalog.

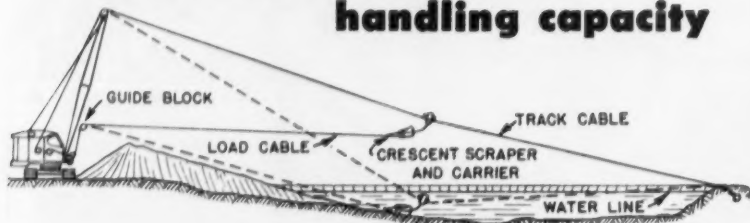
WORTH ASKING FOR—BY NAME

MADESCO BLOCKS

MADESCO TACKLE BLOCK CO., Easton, Pa.

the SAUERMAN METHOD...extends the reach of your crane

the CRESCENT SCRAPER...increases its handling capacity



Drawing shows crane using Crescent Scraper and carrier with a track cable. This arrangement increases effective digging range and permits gravity return to the excavation for a faster operating cycle. Maximum operating span is governed only by amount of cable that may be reeved on the drag drum.

Use This Fast, Economical Method For:

Cleaning Ponds
Trenching Streams
Sludge Removal

Cleaning Under Bridges
Building Reservoirs
Beach Construction

Any crane can handle a Crescent Scraper larger than its regular drag-line bucket. Smaller units can increase their capacity about 50%. Large cranes can usually double their capacity. When the boom is supported by a strut or outrigger, a Crescent of still greater size can be used. Arrangements of this type have increased rated crane capacity as much as 4 to 1.

The Crescent hauls its load on the ground and the load is automatically deposited when the bucket is raised. Only the empty scraper bucket is lifted by the crane.

When a crane is equipped with a track cable, Crescent and carrier, it can reach farther, dig deeper under water or from soft areas without the nuisance of mats. Anchorage for the track cable may be fixed—or movable to provide easy shifting to a new line of operation. A tractor makes an excellent mobile anchorage.

Although the track cable method is best for increasing your machine's range, the Crescent can also be cast like your regular bucket.

Get the facts on how much the capacity of your crane can be increased. Give us the make, model and boom length. Ask for Field Report 228 and Catalog J. Catalog T tells how to use Crescents with tractors.

Important to Users of Blocks and Fittings: Get the new Sauerman bulletins showing the complete line of Wire Rope Fittings and Duralite Sheaves available from stock. Ask for Bulletins 164 and 165.

SAUERMAN

BROS., INC. 612 SO. 28th AVE.
BELLWOOD, ILL.

Crescent Scrapers • Slackline and Tautline Cables • Duralite Blocks



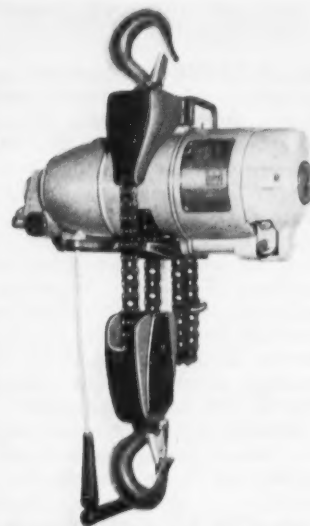
This Indiana contractor used the track cable method with a 1½-cu. yd. Crescent Scraper to trench across a river. After the water main was placed, the scraper backfilled the trench.



Boom support enabled this crane to use a larger Crescent. After a sub-grade of coral was placed, the 4-yd. scraper was reversed and used to grade the beach. Barge-mounted winch served as anchorage for track cable and supplied power to scraper on grading operations.

EQUIPMENT NEWS... continued

engine with a four-speed transmission. A major improvement over other Oliver loaders is the low-silhouette profile of the loader frame, which is said to reduce pedestal height and permit better operator vision and increased stability. The tractor's crawler assembly has four lower track wheels and deep side panels to protect the assembly. Track gage is 46 in. The OC-46 can also mount the Oliver Jet-Trencher, a hydraulic backhoe that digs to 11 ft, loads up to 8 ft 10 in., and swings through 180 deg.—Oliver Corp., 400 W. Madison St., Chicago 6, Ill.



RUGGED HOIST—A new 4,000-lb capacity air-powered hoist has been added to the line made by Gardner-Denver Co.'s Keller Tool Div. Fitted with either roller or link chain, the lifting and lowering speed can be varied from a creep to 10 fpm at full load. Length of the lift is 8 ft. The hoist can be operated with a one-hand control bar or by remote pendant control. A centrifugally governed, fully mechanical brake is provided as standard. The hoist weighs 100 lb equipped with swivel-mounted safety suspension and load hooks. Hook-to-hook dimension is 23½-in. Available accessories include trolleys for the hoist and air hose, a chain basket with a 20-ft capacity, a filter-regulator-lubricator, and a kit that adapts the hoist for operation in explosive atmospheres.—Keller Tool Div., Grand Haven, Mich.



One of Watkins' 26 Macks receiving a load of crushed gravel from a crusher fed by a 1¾-yard shovel.

on the Spaulding Turnpike . . . big-yardage fills at low hauling costs

Grading a three-mile section of New Hampshire's Spaulding Turnpike, R. G. Watkins & Sons, Inc. of Amesbury, Massachusetts, put down 1,580,000 cubic yards of common borrow and 100,000 cubic yards of gravel. This pike, with two 24-foot lanes separated by a 12-foot median, is a 22-mile addition to the Seacoast Turnpike near the White Mountain area. High fills along the Cocheco River and at intersecting roads required big yardage borrow.

Fourteen of the 17 dumpers used by Watkins & Sons on this high-volume hauling were Macks.

Here's the kind of job where Mack efficiency and dependability really pay off in minimum hauling costs. The ability to maintain tight schedules, to keep going month after month with only routine servicing and maintenance, and to operate with ease over difficult terrain and in all kinds of weather puts Macks in a class by themselves for real profit-making performance. Reason enough why Watkins & Sons has 26 Macks in its fleet of 32 dumpers.

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the most complete line of heavy-duty trucks in the industry? Dumpers, mixers, tractors, flat-bed trucks—there's a Mack that will do your toughest jobs more economically, more efficiently, and more profitably. Mack Trucks, Inc., Plainfield, N. J. In Canada: Mack Trucks of Canada, Ltd.

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SUPERIOR CONTINUOUS THREADED COIL RODS



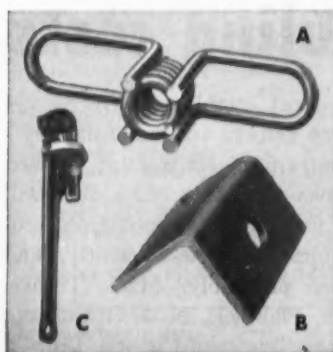
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*Easy***

Superior Continuous Threaded Coil Rods, with or without Coil Wing Nuts and Corner Brackets, are a valuable supplement to Superior Coil Ties and standard working parts when job conditions are unusual or difficult.

In three typical applications, shown at the right, these Continuous Threaded Rods are used; (1) to tie form corners; (2) as an anchor rod tie down and as coil bolts; and (3) as a coupling for two coil ties providing an adjustable form tie.

Available in $\frac{1}{2}$ ", $\frac{3}{4}$ ", and 1" diameters and in any length up to 10 ft., Superior Continuous Threaded Coil Rods in quantities can be cut to length on the job with a heavy-duty hand Coil Rod Cutter.

Superior Continuous Threaded Coil Rods are the answer to unusual or difficult tying problems. When you use Superior you are assured of the *best* in design, material, and workmanship.



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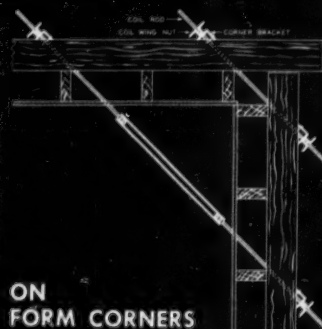
Coarse helix coils form the threads. Easily applied and removed from rod. Develops maximum capacity of rods.

B-CORNER BRACKET

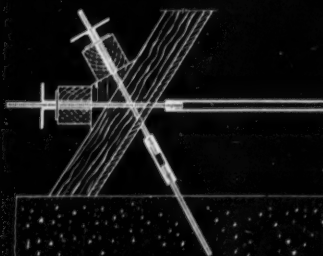
An *exclusive* Superior feature. Provides simple, efficient method of tying form corners and bulkheads.

C-SPECIAL COIL ROD WRENCH

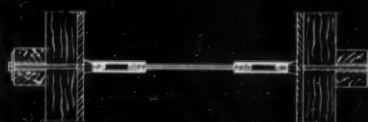
Heavy-duty Stillson type wrench with special jaws for gripping and turning Coil Rods with least damage to threads.



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New Publications

These catalogs and bulletins from manufacturers contain useful information about construction equipment and materials. To obtain a copy, write directly to the manufacturer at the address given.

PIONEER PLANTS—The 44 and 45 series of Pioneer portable crushing and screening plants are described in two new booklets. The new duplex-type plants, which feature a big four-deck screen, can produce one, two, three or four sizes of closely graded product. One of the booklets contains a large cutaway illustration showing the flow of material. It also includes diagrams of nine different screen arrangements and field reports and photos. The other booklet provides specifications and diagrams that show possible arrangements of delivery conveyors.—**Pioneer Engineering, Div. of Poor & Co., 3200 Como Ave., Minneapolis, Minn.**

ALL-PURPOSE TOOLS — "Designed for Each Other", a new booklet issued by the Work Bull div. of Massey-Harris-Ferguson Inc., tells the story of the Work Bull wheel tractors and describes their 20 interchangeable attachments. The tractor line covers five models ranging from 34 to 52 hp. Attachments include loaders, backhoes, fork lifts, blades, trenchers, utility booms, scarifiers, post hole diggers, pipe and cable layers, and snow plows, hauling hitches, brooms, and mower. — **Work Bull Div., Massey-Harris-Ferguson, Inc., 12-L Quality Ave., Racine, Wis.**

NOTES ON EUCS—Euclid Div. of GMC has published folders on four new rear-dump units now in production. The bulletins contain specifications covering the following units: Model S-7, with an overhung engine-type tractor and a 12-ton payload capacity; model S-18, also a semi-trailer, which has a rated payload of 35 tons; model R-18, a conventional type hauler of 18-ton capacity; and model R-40, a tandem-axle machine powered by dual engines.—**Euclid Div., GMC, Cleveland 17, Ohio.**

DETROIT DIESEL LINE—A 19-p. catalog outlining its complete line of power units for all types of in-

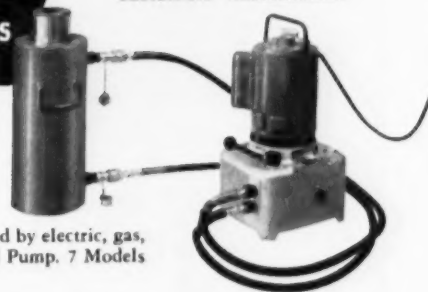
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The "Re-Mo-Trol" Puller Unit is a powerful hydraulic Ram connected by high-pressure hose and remotely operated by electric, gas, air-powered or with hand-operated Pump. 7 Models have "center-hole".



CAPACITY	APPLICATIONS	BENEFITS
10-100 tons 11 models	tensioning wire in pre-stressing concrete, pulling or pressing sleeves, gears, pinions, etc.	lift-pull-or-push in any direction easily & safely from a distance!



2 SIMPLEX "JENNY" CENTER-HOLE PULLERS

The "Jenny" is a rugged, self-contained unit for pulling or pushing the most difficult jobs with hydraulic power and efficiency.

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30-100 tons & models	mines, oil fields, shipyards, railroads, diesel, general maintenance, post tensioning concrete, etc.	push-pulls-lifts without torque through "center-hole".



3 ROL-TOE JACKS

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10, 25 and 50 ton 3 models	for toe lifting heavy machinery and equipment, also transformers.	lifts full capacity on cap or foot!

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CAPACITY	APPLICATIONS	BENEFITS
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THREE SIZES—1½, 3 and 6-Tons

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3-TON



6-TON



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NEW PUBLICATIONS... continued

dustrial applications has been issued by the Detroit Diesel Engine Div. of General Motors. Specifications are given on 31 engine models ranging from 44 to 761 bph. Specs are also listed for the division's new six-cylinder Turbopower engine.—Detroit Diesel Engine Div., General Motors Corp., 13400 W. Outer Drive, Detroit 28, Mich.

PAVING PLANT LAYOUTS—A section of C. S. Johnson Co.'s new 36-p. catalog shows drawings and photos of operating concrete paving plants for highway and airport jobs. A one-stop central mix plant, and one, two, and three-stop batch truck plants are illustrated. Also included are tables and formulas designed to show how to properly utilize equipment to obtain maximum paver production. — C. S. Johnson Co., Champaign, Ill.

LITTLE BROTHER—A new bulletin on Blaw-Knox's Black Top paver, model PF-45, lists 23 operating features and detailed mechanical specifications. Introduced at the Chicago Road Show, the PF-45 is called by Blaw-Knox "the big paver at a small paver price." Like the popular PF-90, the new paver is rubber tired.—Blaw-Knox Co., Construction Equipment Div., Mattoon, Ill.

ENGINE INFORMATION—International Harvester has released a new rating chart for its line of 17 engines. The chart lists brake horsepower ratings on engines with and without fans or accessories. Ratings are corrected to standard conditions at sea level at 60 deg. Ratings are also given on all fuels that can be used in the carbureted units. — International Harvester Co., Construction Equipment Div., 180 N. Michigan Ave., Chicago 1, Ill.

ROAD PROGRAM MAP—A 22x34-in. wall map showing the national routes of the interstate highway system is available through LeTourneau - Westinghouse's distributor organizations. Printed in four colors on heavy paper, the map also includes a chart that forecasts highway spending by states through the year 1959. Address Highway Program Map, your local distributor, or write LeTourneau-Westinghouse Co., Dept. 085, Peoria, Ill.

continued on page 287

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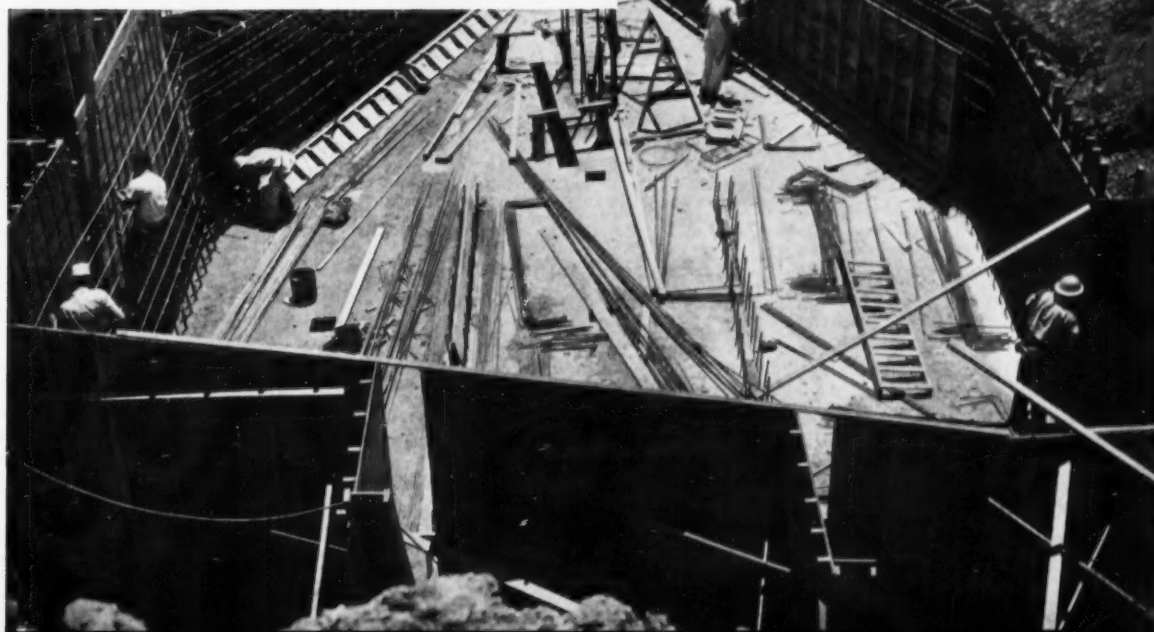
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NEW PUBLICATIONS...

continued

BLAW-KNOX LINE — The complete line of Blaw-Knox equipment for concrete and bituminous paving, ready-mix plants, and general construction use are colorfully illustrated in a new 24-p general bulletin. In addition to describing some 14 basic items, the bulletin also lists numbers of other literature devoted to specific types of equipment.—**Blaw-Knox Co., Construction Equipment Div., Mattoon, Ill.**

HIGHWAY PRODUCTS—A new 20-p. brochure gives comprehensive information on the complete line of Kaiser Aluminum highway products. Design, construction, and installation data is included for Kaiser bridge railings, extruded highway signs, sign blanks, and other accessories.—**Kaiser Aluminum & Chemical Sales, Inc., Highway Product Sales Office, 919 N. Michigan Ave., Chicago, Ill.**

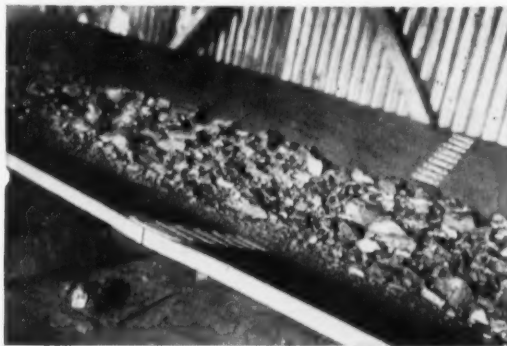
CAT GRADERS—A new booklet describes the various jobs that can be handled by Caterpillar motor graders. Illustrations show the graders handling bank sloping, road construction, ditching and other jobs. Design features are discussed and a list of available attachments is included. The Preco blade leveling device is also explained.—**Caterpillar Tractor Co., Advertising Div., Peoria, Ill.**

DIAMOND BLADE GUIDE — A new pocket-sized guide enables the contractor to choose the proper diamond blade for various types of concrete and masonry cutting jobs. Easy to use, the new pocket selector ranks the blades according to their efficiency range. It covers a complete list of concrete and masonry product ranging from easy-to-cut non-abrasive materials up to porous, abrasive materials.—**Consolidated Diamond Tool Corp., 32 Yonkers Ave., Yonkers, N.Y.**

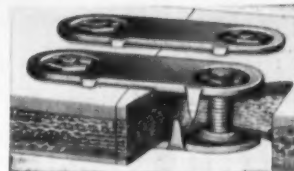
STUD WELDING—A new operation manual tells how to get the best results from Nelson stud welding equipment. The booklet includes a trouble-shooting chart and procedures for correcting unsatisfactory working conditions. A section of the manual is devoted to welding large diameter studs with Nelson's new NS-9 stud welding gun. The manual available in either desk or pocket size, also

continued on next page

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Bark River Culvert & Equip. Co., Eau Claire, Wis., cleans equipment and parts with Malsbary 250, finds it delivers much more volume than steam vapor cleaner formerly used.

Here's a chart based on actual time studies from competitive demonstrations of steam vapor cleaners vs. Malsbary HPC (high pressure combination) cleaners. Note the time and dollar savings you can make with HPC.

CLEANING JOB	STEAM VAPOR CLEANER	MALSBARY HPC CLEANER
A-C HD-20 complete, ready to paint	Size: 120 gph. max. 5½ hrs. \$12.30	Model 250 2¼ hrs. \$7.53
3500 Manitowoc complete, inside and out	Size: 120 gph. max. 40 hrs. \$98.40	Model 250 10½ hrs. \$35.18
Model HH Payloader	Size: 120 gph. max. 3 hrs. \$7.38	Model 250 1½ hrs. \$5.03
International TD-24	Size: 180 gph. max. 6 hrs. \$17.40	Model 250 2 hrs. 35 min. \$9.65

Note: Costs include labor, fuel, cleaning compound, electricity, water, and hose depreciation.

Why HPC Cleans So Much Faster — Malsbary (and only Malsbary) HPC cleaners deliver 240-480 gph. of 325° F. solution at 300-400 psi. This combination of volume and pressure plus solution 100° hotter than any other cleaner, makes the difference. It literally explodes hot solution from the nozzle, softens and blasts away stubborn tars, corrosive grease and dried muck on a time schedule other cleaners can't touch.

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Make this side-by-side test — If you're now using or considering a steam vapor cleaner, ask your Malsbary dealer for a side-by-side competitive demonstration. Let each cleaner do one half of the same rig. You'll quickly see why HPC cleans so much better and faster. Try it — call your Malsbary dealer now (see yellow pages of phone directory) ... or write us.



Room C6, 845 92nd Ave., Oakland 3, Calif.

NEW PUBLICATIONS...

continued

provides information on disassembling, assembling and maintaining Nelson equipment. — **Nelson Stud Welding Div., Gregory Industries, Inc., Lorain, Ohio.**

WIRE ROPE DATA — A new 16-p. bulletin contains data on the construction features, applications, and sizes of Hazard's line of wire rope. The bulletin covers wire rope used on angle dozers, backhoes, backfillers, bulldozers, cable ways, concrete mixers, drag scrapers, and other types of construction equipment. — **Hazard Wire Rope Div., American Chain & Cable Co., Inc., Wilkes-Barre, Pa.**

HUBER-WARCO LINE — A new 32-p. bulletin lists the complete road machinery line offered by Huber-Warco. It describes in detail each of Huber-Warco's motor graders, tandem rollers, three-wheel rollers, and the maintainer. — **Huber-Warco Co., Marion 12, Ohio.**

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These 3 big features will mean more to you in profits than anything you can find in any other 2½-yd. shovel-crane. They mean greater operating ease, longer life, increased crane capacities and reduced maintenance. Of course, there are many more features in the Lorain-85A . . . torque converter power-take-off, new "operator designed" cab, full air controls of all crawler operations, removable counterweight, are but a few. The Lorain-85A is years ahead in the important features that will put you 'way ahead in profits.

Be sure you know all about the "85A" . . . your Thew-Lorain Distributor will explain every detail!

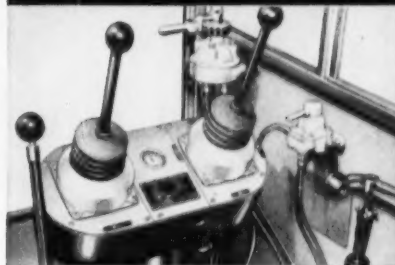
THE THEW SHOVEL CO., Lorain, Ohio

"SHEAR-BALL"™ TURNTABLE MOUNTING



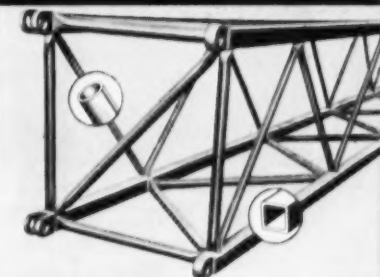
Turntable is secured to crawler and revolves easily and freely on a huge "ball bearing." No center pin or nut, centering gudgeon or exposed roller path . . . no turntable rollers . . . no constant adjustment, maintenance or lubrication problems.

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The newest of all shovel-crane power controls. "Metered Air" feeds power to clutches at any rate desired — yet operator retains full "feel" of all operations. Fewer levers, fewer motions, faster, smoother, less effort, less fatigue.

SQUARE-TUBULAR-CHORD* BOOM

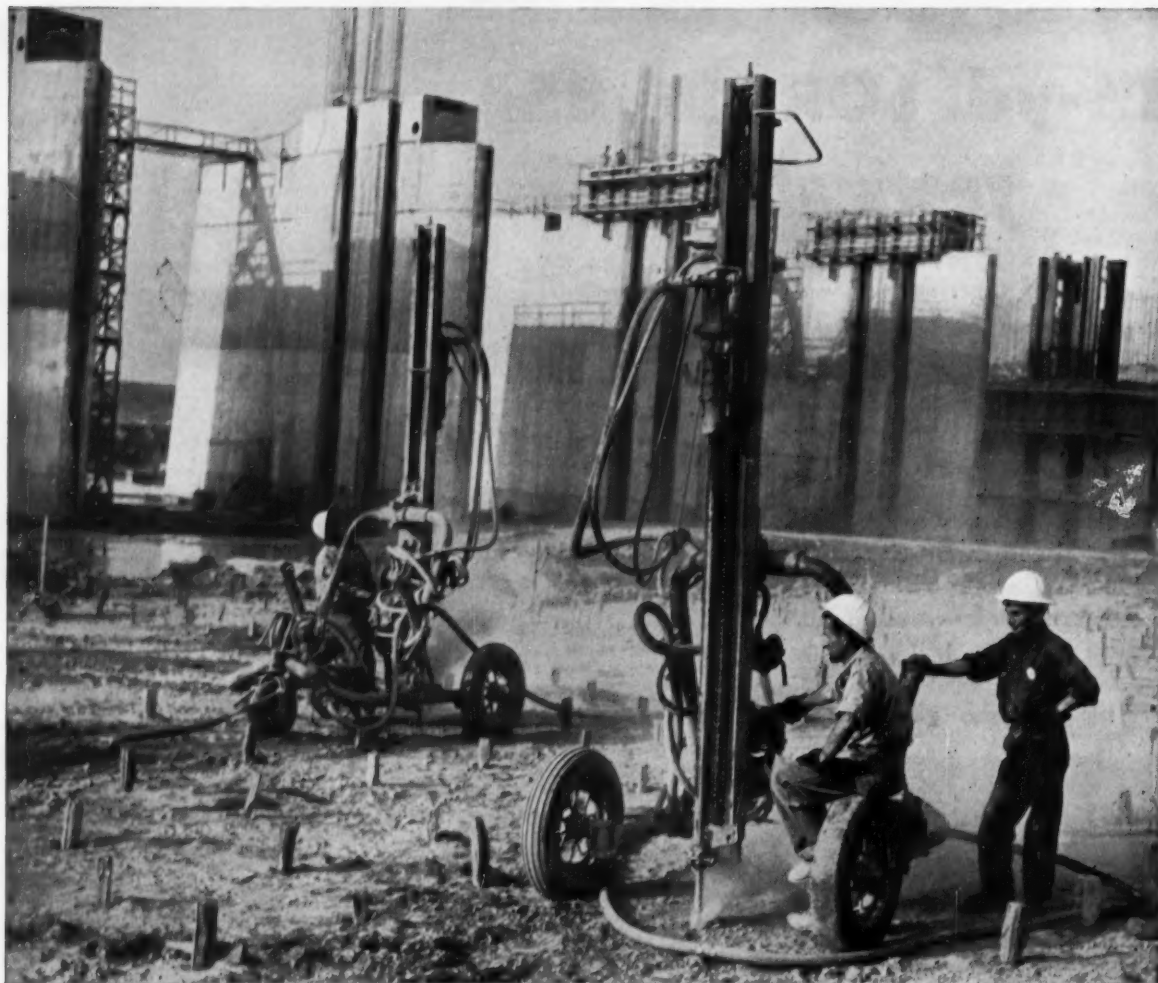


Reduces boom weight and increases lifting capacities. 40 to 48-ton crane capacities on general-purpose crawler . . . 50 to 60-ton on larger, wider crawler . . . up to 200 ft. boom, plus 40 ft. extension available.

*U.S. and foreign patents applied for.



**THEW
LORAIN**



Bethlehem Hollow bites into dolomite at Iroquois Dam, on St. Lawrence Seaway. The dam, for Power Authority of State of New York, is scheduled for completion early in 1958. Joint Venture Contractors: Peter Kiewit Sons' Co., Omaha; Arthur A. Johnson Corp., New York; Al Johnson Construction Co., Minneapolis.

Moving 250,000 cu yd on the St. Lawrence

One of the major undertakings of the St. Lawrence Power Project was the removal of 250,000 cu yd of hard dolomite at the site of Iroquois Dam, near Waddington, N. Y. Most of the blast holes, which were up to 14 ft in depth, were made with wagon drills, equipped with 1-in. round Bethlehem Hollow Drill Steel.

Iroquois Dam, a 2500-ft control dam, is designed to control the water elevation of Lake Ontario, which has been controlled upstream from this structure by a natural rock weir. The dam will be a buttressed gravity concrete structure. It will be 60 ft high from foundation to roadway deck, and will contain 32 gate-controlled sluiceway openings. The vertical lift gates are to measure 48 ft by 52 ft.

Wherever rock removal is called for, you can count on eco-

nomical drilling with Bethlehem Hollow Drill Steel. This is because Bethlehem Hollow is rolled from a tough grade of fatigue-resisting steel. It has a uniformly centered hole, and its wide quenching range makes it easy to heat-treat for the proper balance of toughness and wear-resistance. It also provides long-wearing threads and strong shanks.

Bethlehem Hollow is stocked in Carbon and Ultra-Alloy grades in rounds, hexagons and quarter-octagons. It is furnished in lengths of from 18 to 27 ft, and longer. Specify Bethlehem Hollow for your next rock job.

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BETHLEHEM HOLLOW DRILL STEEL CARBON AND ULTRA-ALLOY



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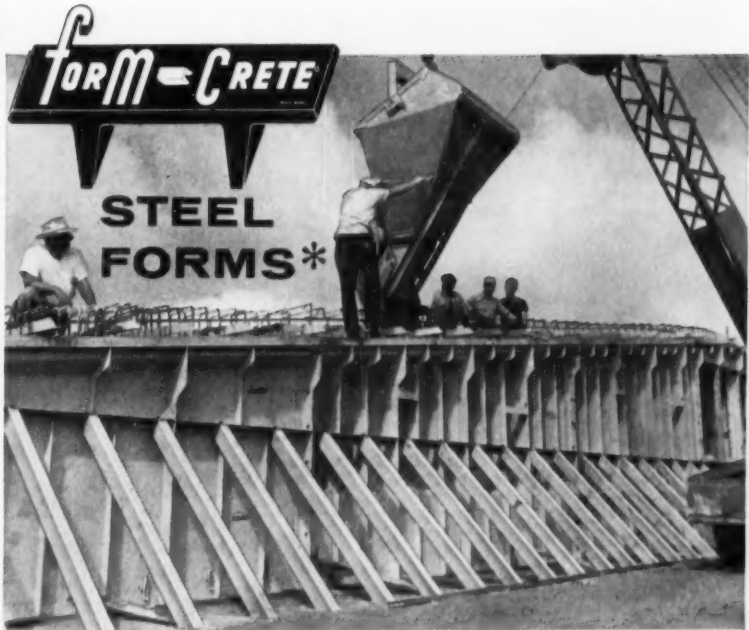
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for American Cyanamid's new phosphate storage warehouse

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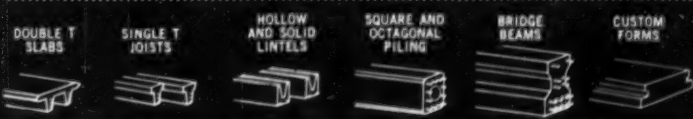
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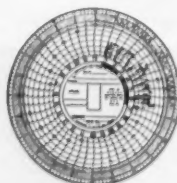
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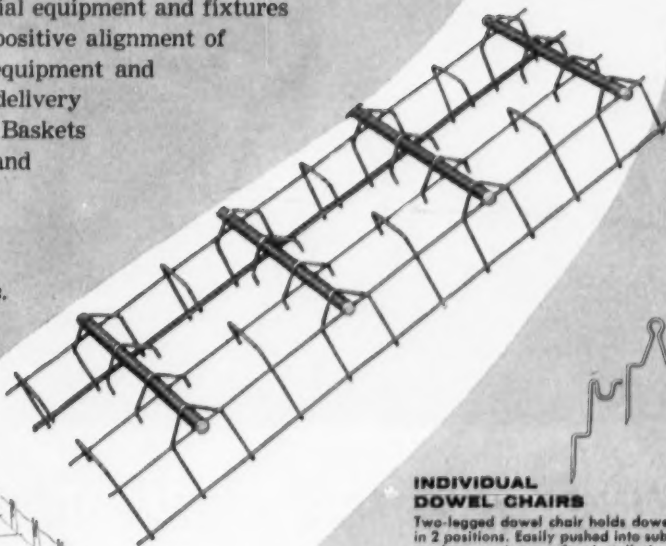
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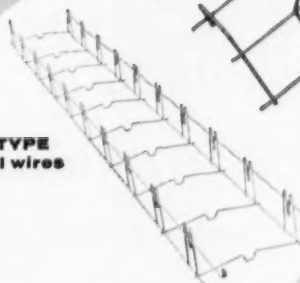
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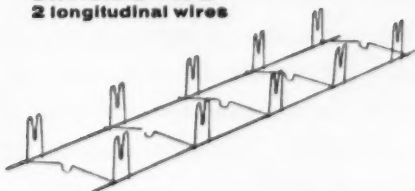
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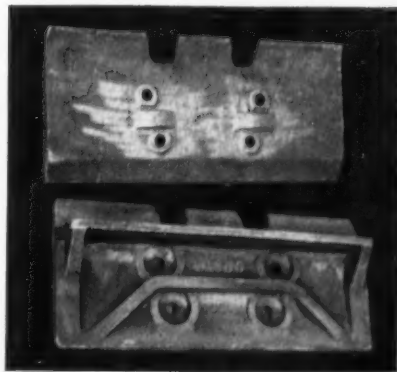


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Amsco Manganese Steel Tractor Shoes

In addition to excellent impact and abrasion resistance, Amsco Tractor Shoes have counter-sunk bolts. This means less wear on bolts, often saves bolt-replacement when changing pads.



AMSCO

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Methods Memo...

A Cash Dividend

The safety program that made the \$100-million Third Tube of the Lincoln Tunnel under the Hudson River between New Jersey and New York City the safest tunnel job in history also paid off in cash.

The Port of New York Authority collected \$1.3 million in refunds from the Indemnity Insurance Co. of North America. PNYA carried the insurance for all the contractors on the job.

Driving the underwater section of the tunnel was completed without a single fatality under air pressure. There was only one fatality during the entire four years and eight months of construction. (One other worker died of a heart attack).

By way of comparison, the first two tubes of the Lincoln Tunnel, completed in 1937 and 1945, cost \$88 million and took seven construction men's lives. The \$83-million Brooklyn-Battery Tunnel, completed in 1947, cost eight lives. The Queens-Midtown Tunnel cost \$53 million and seven lives.

Vincent J. Mooney was safety director on the job for the PNYA. Major contractors included a joint venture of Mason-Johnson-MacLean and Gull Contracting Co., Grow Construction Co., Cayuga Foundations Corp., and Bethlehem Steel Co.

Two engineers on the job were cited for their work. Howard L. King, vice president and chief engineer of Mason & Hanger-Silas Mason Co. was named Metropolitan Civil Engineer of the Year by the N.Y. metropolitan section of ASCE.

John M. Kyle, chief engineer of the PNYA, was awarded the agency's Distinguished Service Medal. At the presentation, Kyle was cited as "the human driving shield behind the Third Tube."

Great Lakes Dredging

An underwater blast in the Detroit River on May 28 broke first ground for the \$136-million job of deepening the Great Lakes Connecting Channels to accommodate big, ocean-going cargo vessels.

The dredging project will cover about 130 miles of channels, generally from 300 ft to 1,200 ft wide. It will involve removal of approximately 44,000,000 cu yd of earth and rock.

Army Engineers estimate that the project will require the full output of eight large dipper dredges, two large hydraulic dredges, and a sea-going hopper dredge attended by tugs, derrickboats, launches, and dump scows. Special drillboats will precede the dredges where the bottom is rock. A work force of about 800 will man this fleet.

The channels now provide minimum depths of 21 ft for upbound traffic and 25 ft for downbound shipping. When the deepening job is completed in 1963, both channels will have a minimum depth of 27 ft.

First work is in the Amherstburg Channel sec-

tion of the Detroit River. This portion of the job will cost \$23 million. Marine Operators, Inc.,—a joint venture of Albert Johnson Construction Co., Peter Kiewit Sons' Co., Cunningham Kiewit Co., and Morrison Knudsen Co., Inc.,—holds contracts for work on three sections. Great Lakes Dredge & Dock Co. has a contract for one section.

Deepening of the channels will save U.S. shippers alone an estimated \$10 million per year in transportation costs.

Graduating Capitalists

Louis E. Wolfson, president of Merritt-Chapman & Scott Corp., is "planting the seeds of capitalism" in the graduating class of the University of Georgia.

Wolfson, a Georgia alumnus, will present each of the 1,150 members of this year's graduating class with a share of M-C & S stock from his personal holdings.

Last year Wolfson distributed 961 shares to Georgia graduates. Today, he reports, 916 of those 1956 graduates retain their shares; 133 have doubled their holdings; 42 have three shares; and three have added more.



Safety in Color

Building Trades Unions of Syracuse, N.Y., and Turner Construction Co. are experimenting with colored shirts as a safety aid.

On the \$12-million Carrier Corp. building each craft wears shirts colored to indicate the degree of hazard in its work. Excavation men wear red; structural steel workers, orange; masons, exterior carpenters, and concrete workers, yellow; plasterers, painters, and interior carpenters, white; and laborers, purple.

In the photo, Fred Livingston, Turner safety engineer, William Kallbach, business agent of the Iron Workers local, and Michael Eagan, business agent of the Painters local, display some of the shirts.

guide to BETTER CONCRETING*

Extra Water Dilutes Quality



when you add you subtract

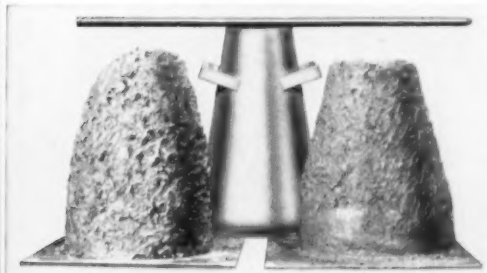
Your ready-mixed concrete producer uses the proper amount of water for the specified slump. Adding extra water, *subtracts* quality—like diluting glue.

Extra water reduces strength and durability; increases bleeding, permeability and shrinkage; increases finishing time.

*From booklet by this name. Covers points that can make the difference between a good job and a poor one. Copy on request.

a quiz on CONCRETE

Pozzolith Produces Equal Workability
With Up To 20% Less Water



PLAIN MIX		POZZOLITH MIX
6.75 gallons	W/C	5.63 gallons
2 inches	SLUMP	3 inches

Question: How can required workability and lowest end cost be obtained?

Answer: With Pozzolith, key to producing concrete of required workability with the least amount of water.

"With given materials, that mix is best which with a given cement content requires the least amount of water per unit volume of concrete" ACI Manual of Concrete Inspection, 3rd Edition, Pg. 31.

To get this better quality concrete, with lowest end cost, specify Pozzolith Ready-Mixed Concrete — available from your local ready-mix dealer.



THE MASTER BUILDERS co.

Division of American-Marietta Company

Cleveland 3, Ohio—Toronto 9, Ontario

Cable Address, Mastmethad, N. Y.

POZZOLITH MAKES BETTER CONCRETE



With Ready-Mixed Concrete makes available possible unit water content for a given ability . . . for dense, segregation-free foundations and other concrete construction.



With Pozzolith Ready-Mixed Concrete, control of rate of hardening gives desired handling and finishing time under widely varying job conditions . . . for slab and other concrete work.



Control of entrained air, another Pozzolith Ready-Mixed Concrete feature, provides optimum air content without sacrificing other qualities . . . for sewage plants and other exposed concrete.

CARBIDE INSERT? or MULTI-USE?



LOCATION: Massachusetts Turnpike, Palmer, Mass.

OPERATING CONDITIONS: Hard abrasive granite

Grandview Construction Corporation speeds deep hole drilling on Mass. Turnpike with Timken® carbide insert bits

GRANDVIEW Construction Corporation had to drill extremely deep holes through hard abrasive granite on its sections of the 123-mile Massachusetts Turnpike. To get speediest drilling at the most economical cost, Grandview used Timken® carbide insert bits. They got maximum production, kept bit cost per foot-of-hole at rock bottom.

For economical drilling in hard, abrasive ground, Timken carbide insert bits are your best bet. But carbide bits may not be the best choice for *every* job.

In ordinary ground, you get more economical results with Timken multi-use bits. Correctly controlled and reconditioned, they give you lowest cost per foot-of-hole when you can drill out full increments of drill steel.

With Timken carbide insert and multi-use bits, your drillers save time. Dozens of different bits fit the *same* drill steel, let you switch bits fast as the ground changes. And both types of bits have a special shoulder union that protects threads against drilling impact.

Timken rock bits are made from electric furnace

Timken fine alloy steel. We're America's only rock bit manufacturer that makes its own steel.

For expert help on selecting the best bit type for your drilling jobs, write The Timken Roller Bearing Company, Rock Bit Division, Canton 6, Ohio. Cable address: "TIMROSCO".



Timken threaded
multi-use rock bit



Timken threaded
carbide insert rock bit

**your best bet
for the best bit
... for every job**

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.